NOTICE

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Status Report for Monitoring of Natural Attenuation at IHSS 118.1

Environmental Restoration
Rocky Flats Environmental Technology Site

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STATUS REPORT FOR MONITORING OF NATURAL ATTENUATION AT IHSS 118.1

Rocky Mountain Remediation Services, L.L.C.

August, 1999

Revision 0

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1.0 INTRODUCTION

This preliminary report summarizes the progress on the Individual Hazardous Substance Site (IHSS) 118.1 natural attenuation study, which was initiated in FY99. The object of this report is to provide sample results for the suite of analytes that were sampled in the first sampling round and determine whether the suite should be modified given the results obtained. The overall goal of the project is to characterize the potential for natural attenuation to be a significant factor in the remediation strategy for the IHSS 118.1 Dense Non-Aqueous Phase Liquid (DNAPL) source. Carbon tetrachloride (carbon tet) is the main contaminant of concern at IHSS 118.1 and is the result of spills related to a carbon tet storage tank, which has been subsequently removed. Characterization work was initiated in 1997 to identify the extent of the DNAPL source and determine the feasibility of extracting the DNAPL through pumping or excavation. Source removal was postponed because it is presently unfeasible to excavate the source due to the number of active process pipes that run through the source area. The decision was then made to evaluate the potential for the carbon tet plume to be effected by natural attenuation processes.

A drilling and sampling program was designed to collect the data necessary for decision making with respect to natural attenuation. Eight wells were installed in a pattern so as to have two wells upgradient of the DNAPL source, three wells along an east-west line where two wells were in the source, and one well located at a side gradient to the source. The remaining three wells were installed in a line approximately 60 –70 feet downgradient from the source. The wells were installed in February 1999 and the first round of sampling was completed by the end of March. In addition, Volatile Organic Compound (VOC) samples were collected from DNAPL in well 05497. Figure 1 shows the location of the wells and sampling locations.

The wells were installed with bladder pumps so that samples could be collected with aeration of the sample kept at a minimum. This is important when collecting VOC samples and when measuring dissolved oxygen and redox parameters. A flow-through cell containing the field parameter probes was used for collection of temperature, dissolved oxygen (DO), redox, alkalinity, specific conductance and pH. A HACH spectrophotometer was used to measure ferrous iron. All other samples were sent to off-site laboratories for analysis. Full suites were obtained from seven of the eight wells. Upgradient well 18899 was dry and could not be sampled. Table 1- 1 lists the analyses performed for the IHSS 118.1 study as listed in the IHSS 118.1 Sampling and Analysis Plan (RMRS, 1998). Water levels were obtained for all wells in the project.

Table 1-1
Sample Types/Analytical Methods

Line Item Code	Analytes	Analytical Method	Media Type	Container	Preservative	Comments/Holding Time
SS01B005	Volatile Organic Compounds	SW-846 Method 8260	Water	2 x 40 ml VOA vials - Teflon lined septa lids	Cool, 4° C, HCl	Zero head space 14 day hold time
SS01B006	Volatile Organic Compounds	SW-846 Method 8260	Soil, Waste	60-ml wide mouth glass jar with Teflon lined lid	Cool, 4°C,	Zero head space 14 day hold time
SS02B006	Semivolatiles	SW-846 Method 8270B	Water	3-liter glass jar	Cool, 4°C	7 day hold time
SS02B006	Semivolatiles	SW-846 Method 8270B	Soil	250-ml wide mouth glass jar with Teflon lined lid	Cool, 4° C	14 days to extraction, 40 days from extraction to analysis
RC01B0003	Americium, Plutonium & Uranium	ASD SOW for Isotopics RC01	Soil	125-g wide mouth glass jar	Cool, 4° C	
OS01A002	Gross Alpha/Beta	ASD SOW for Isotopics RC01 Module OS01A	Water	1 liter plastic bottle	Cool, 4° C	
OS01A003	Gross Alpha/Beta	ASD SOW for Isotopics RC01 Module OS01A	Soil	60-g wide mouth glass jar	Cool, 4° C	
SS06B037	Sulfates	SW-846, 9035, 9036	Water	1 liter plastic bottle	Cool, 4° C	Sulfates, Sulfites and Alkalinity come from same bottle 28 day hold time
SS06B039	Sulfides	SW-846 9030A	Water	1 liter plastic bottle	Cool, 4° C	Sulfates, Sulfites and Alkalinity come from same bottle 7 day hold time
SS06B002	Alkalinity	SW-846 310.1, 320.2	Water	1 Liter plastic bottle	Cool, 4° C	Sulfates, Sulfites and Alkalinity come from same bottle 14 day hold time
SS06B020	Nitrates	SW-846 , 300.0	Water	1 liter plastic bottle	Cool, 4° C	48 day hold time
SS06B025	Total Organic Carbon	SW-846 415.1	Water	1 liter plastic bottle	Cool, 4° C pH<2 w/HCl	28 day hold time
SS06B024	Dissolved Organic Carbon	SW-846 415.1	Water	1 liter plastic bottle	Cool, 4° C	28 day hold time
SS06B010	Chlorides	E300.0	Water	100 ml. plastic bottle	None	28 day hold time
Field	pH	SW9040	Water			
Field	Dissolved Oxygen	E360.1	Water			
Field	Oxidation-Reduction Potential	ASTM D1498	Water			
Field	Temperature	E170.1	Water			
Field	Conductivity	SW9050	Water			

1.1 Footing Drain Outfall Samples

Two outfall pathways were sampled that are associated with the Building 771 footing drain system. Building 771 is located approximately 120 feet due north of IHSS 118.1 and has a footing drain system that collects groundwater from the south side of the building. Because the footing drain system is downgradient of the carbon tet groundwater plume, it was important to sample the outfalls from this system to determine if significant concentrations of VOCs were present. Figure 1 shows the location of the sample locations. One outfall is located to the west of Building 771 and flows to a small stream which enters North Walnut Creek to the north. This outfall could be sampled directly at it's terminus on the hillside, and has a location name of 771-FDOUT2. The other outfall is believed to be located under the North Perimeter road and probably enters North Walnut Creek. The pipeline to this outfall extends out from the northwest corner of Building 771 and has two manholes that were available for sampling. Sample location 771-Manhole3 is a manhole accessing the outfall pipeline outside Building 771. The second location (NW771-Manhole) is located at the confluence of drain pipes near the north perimeter road.

For purposes of this preliminary evaluation, three of the seven wells were chosen for discussion. Well 18799 is the only upgradient well that had water, so it is used for background comparison. Well 18499 is in a line due north of 18799 and is in the DNAPL source. Samples were collected above the DNAPL in the well. Well 18199 is a downgradient well due north of well 18499. These wells comprise a representative cross section of groundwater quality across the IHSS 118.1 site. In most cases, data from the other wells conform to those found in this subset. Charts were derived to show the relative changes in water quality across the IHSS. Appendix A lists the key analytical results obtained from the wells. Evaluation of the various parameters used for the natural attenuation project leads to a number of conclusions with regard to whether the parameters are necessary for the continued tracking of VOC degradation.

1.2 Natural Attenuation

Natural attenuation is defined as the observed reduction in contaminant concentrations as contaminants migrate from the source in environmental media. This reduction in concentration can be due to a number of fate and transport processes in groundwater including, dilution, dispersion, sorption, volatilization and biotic and abiotic transformations. Biodegradation or bioremediation is used to describe the portion of natural attenuation that is brought about by biological degradation mechanisms. Biological degradation typically involves bacteria that occur naturally in the soil and groundwater. Under the right conditions these bacteria can break down certain fuel hydrocarbons and certain chlorinated organic compounds.

The main mechanism for the biological breakdown of chlorinated organics is through reductive dechlorination reactions. Under reductive dechlorination, a chlorinated organic compound such as carbon tet is used as an electron acceptor, which causes the compound to gain a hydrogen atom at the expense of a chlorine atom. The dechlorination of carbon tet would cause chloroform, methylene chloride and chloromethane to sequentially form as chlorine is progressively removed from the original carbon tet compound.

For biodegradation to occur there must be an electron acceptor, a source of carbon to serve as an electron donor and a favorable environment in the aquifer for the metabolic reactions to take place. The IHSS 118.1 sampling program was designed to provide evidence that these processes are taking place. Wiedemeier et al (1996) have developed a simple system for determining whether biodegradation is occurring at a site based on applying scores to the chemical parameters discussed in this report. The criteria used is summarized in Appendix B. A score of 0 to 5 points is suggestive of inadequate evidence of biodegradation. A score of 6 to 14 suggests limited evidence of biodegradation, a score of 15 to 20 shows adequate evidence and scores above 20 show strong evidence of biodegradation.

2.0 ELECTRON DONORS

The process of natural attenuation that would degrade chlorinated organic compounds like carbon tet is reductive dechlorination. Reductive dechlorination is the substitution of hydrogen for chlorine atoms within the chlorinated organic compound, which causes it to progressively break down into daughter products. This process requires that there be a source of electron donors, which is typically organic carbon. Carbon can be utilized either as natural carbon in the aquifer, or can be acquired from the breakdown of petroleum hydrocarbons. The following analyses were performed to determine available electron donor activity at IHSS 118.1.

2.1 Semivolatile Organic Suite

The semivolatile organic suite was collected because of a perception that there had been a diesel spill in the area of IHSS 118.1. Diesel by-products could supply the electron donors that are necessary for reductive dechlorination of the carbon tet and breakdown products. Diesel fuel is composed of such indicator compounds as napthalene, phenanthrene, anthracene, chrysene etc., as opposed to the BTEX compounds (benzene, toluene, ethylbenzene and xylenes) which are common in gasoline. Based on the data collected, there is no evidence of either diesel or gasoline indicator compounds in the vicinity of IHSS 118.1. Therefore it may be prudent to discontinue the semivolatile analyte suite after one more round of sampling.

2.2 Total Organic Carbon and Dissolved Organic Carbon

Total organic carbon (TOC) and dissolved organic carbon (DOC) were collected to ascertain the availability of carbon in the environment to serve as an energy source for reductive dechlorination. Figure 2 shows that both DOC and TOC are within the 3-4 mg/L range. Wiedemeier et al (1996), suggest that DOC above 20 mg/L assures that enough carbon is present to drive dechlorination. Therefore the limited amount of carbon in groundwater may be retarding the rate of reductive dechlorination at IHSS 118.1. With respect to further sampling, the Wiedemeier paper uses DOC as an indicator parameter, but does not discuss TOC. Given the similarity in concentration, it is suggested that only DOC be sampled after one more sample round.

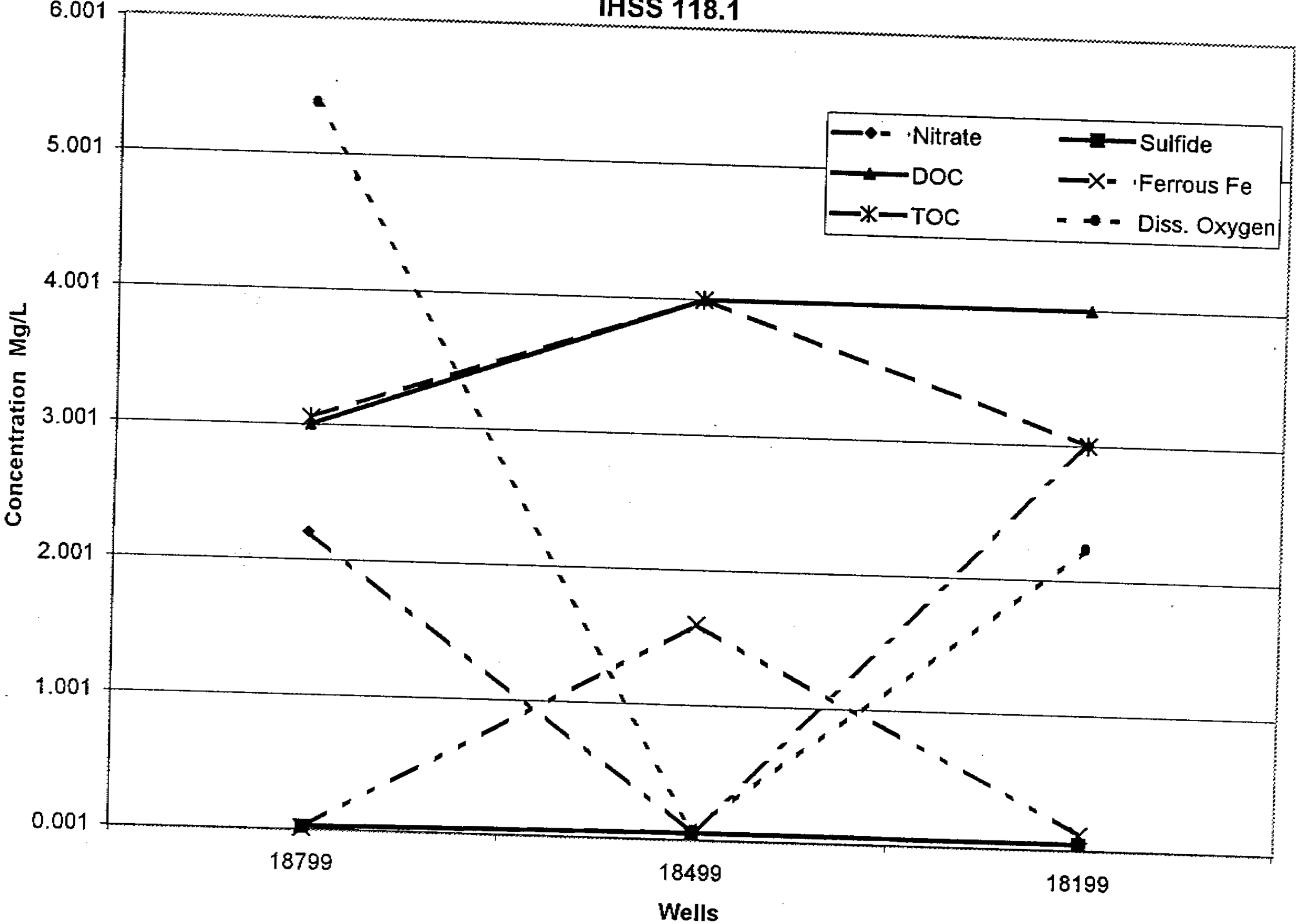
3.0 ELECTRON ACCEPTORS

In order to effect reductive dechlorination of chlorinated organic solvents, the solvents must be able to be electron acceptors. This process occurs when there are sufficient electron donor sources present, the proper chemical environment exists; and a lack of other electron acceptors that would compete with the solvent compounds as electron acceptors.

3.1 Carbon Tetrachloride

Carbon tetrachloride (carbon tet) is the dominant organic compound found in IHSS 118.1. If biodegradation is occurring by reductive dechlorination, carbon tet would breakdown progressively to chloroform, dichloromethane, chloromethane, and ultimately to carbon dioxide and water. If reductive dechlorination was occurring, carbon tet would be seen to progressively decrease in concentration with time as the breakdown products increased in concentration. Downgradient wells would also reflect an increase in breakdown products relative to carbon tet. Charts 2 and 3 show the trends in carbon tet and daughter species. The sample from the pipe outfall near 771 is also included. In Figure 3 carbon tet can be seen to decrease in concentration from the source to downgradient well 18199. This would be expected if biodegradation was occurring. However the trends in chloroform and chloromethane do not increase in downgradient well 18199. Methylene chloride exhibits a similar behavior, but must be viewed with caution because it is a common lab contaminant and some was reported in the lab blank. The data suggest that there are daughter products from reductive dechlorination of carbon tet in the source area, but increased breakdown downgradient of the source is not readily apparent. By looking at the ratio of daughter products to carbon tet with time, a better indication of in-source biodegradation would be obtained. Therefore, it is suggested that sampling for these compounds continue for a sufficient time period to establish a rate of breakdown at the source.

Figure 2
Nitrate, DOC, TOC, Sulfide, Ferrous Iron and DO Concentrations at IHSS 118.1



The Building 771 outfall locations described above were also sampled for the VOC suite. Appendix A lists pertinent results from the sampling. Location 771-FDOUT2 shows a carbon tet concentration of 12 ug/L and a chloroform concentration of 23 ug/L. The outfall has a very low flow, which suggests that it may be shut off. Because carbon tet and chloroform are the dominant components of the carbon tet plume, it appears that some of the plume is being collected in the footing drain system. The other two sample locations showed no significant VOC detections.

3.2 Dissolved Oxygen

Dissolved oxygen (DO) is the favored electron acceptor used by bacteria for the biodegradation process. Anaerobic bacteria cannot function at DO concentrations above .5 mg/L and hence, reductive dechlorination cannot occur (Wiedemeier, et al, 1999). Figure 2 shows that upgradient DO concentration at well 18799 is at 5.4 mg/L and decreases to .06 mg/L in source well 18499. DO concentration rises again in downgradient well 18199. Taking the data at face value, it would appear that DO levels are detrimental for anaerobic degradation of organic compounds except at the source. DO was measured using a DO probe inside a flow-through cell at the well head. It could be that this method, though far superior to those obtained from bailed water, may allow for some oxygenation of the groundwater. Because DO is one of the most crucial measurements for determining the effects of biodegradation, downhole probes have been acquired to assure a representative measurement is obtained in future sample events.

3.3 Nitrate and Sulfate

Nitrate and sulfate were sampled because they, along with dissolved oxygen, can compete with chlorinated solvents as electron acceptors. If high levels of nitrate and/or sulfate were to exist in the groundwater in the vicinity of IHSS 118.1, the amount of reductive dechlorination of carbon tet and its by products could be retarded. The graph on Figure 2 shows the values for nitrate along the three well cross section at IHSS 118.1. The nitrate concentration in upgradient well 18799 is 2 mg/L which is near the RFETS background mean of 1.4 for Rocky Flats Alluvium (EG&G, 1993). In Figure 2 nitrate concentration is seen to decrease at the source and then increase again in concentration away from the source. This trend would be expected if biodegradation was occurring in the source area. Wiedemeier et al, 1996 have a scoring system for determining the potential for biodegradation. They suggest that a concentration of nitrate above 1 mg/L may impact biodegradation of chlorinated organics. Given the low concentration of nitrate in the vicinity of the IHSS (.05 mg/L at source well 18499), it would seem that nitrate is being removed from the process locally, but that nitrate concentration is perhaps impacting the biodegradation process away from the source. Because nitrate is a key indicator of the efficacy of biodegradation on chlorinated solvents continued sampling is advised.

Figure 3
Carbon Tetrachloride and Chloroform Concentrations at IHSS 118.1

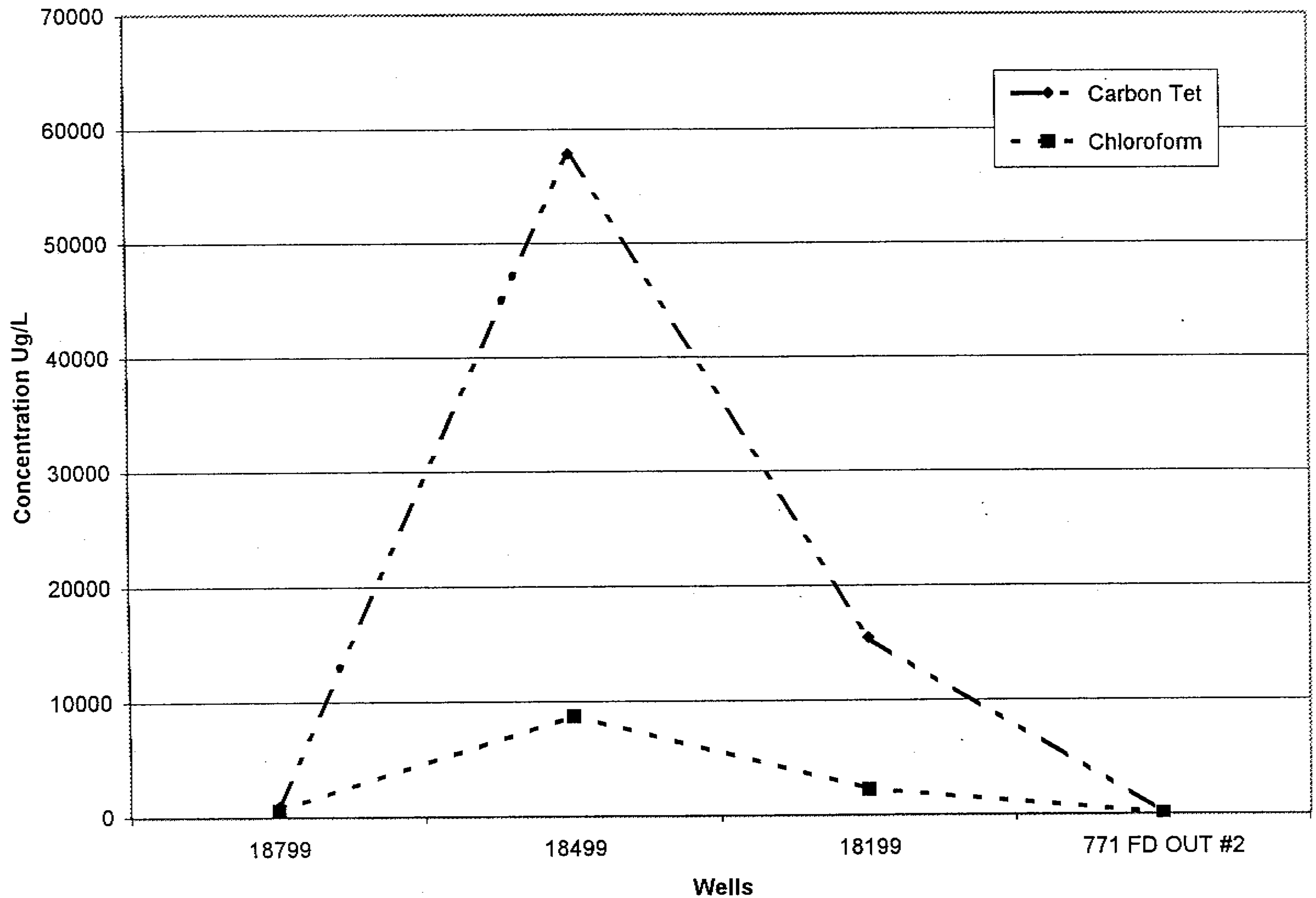


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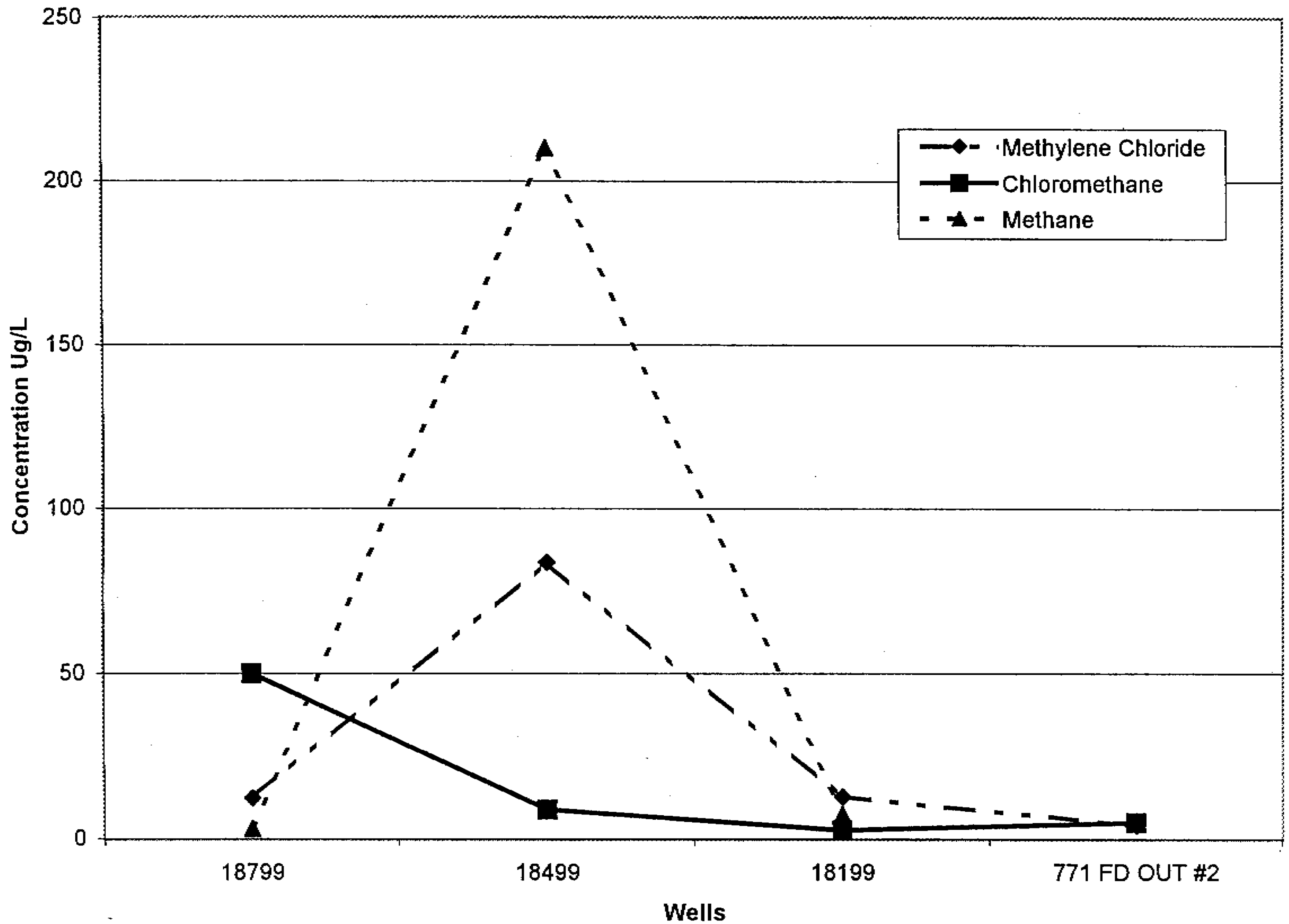
Figure 4
Methylene Chloride, Chloromethane and Methane Concentrations at IHSS 118.1



The sulfate concentration in upgradient well 18799 is 46 mg/L, which is above the RFETS background mean of 22 mg/L (EG&G, 1993). Figure 5 shows the concentration of sulfate dropping near source well 18499, and then increasing in downgradient wells. This trend would be expected if biodegradation was occurring in the source area. Wiedemeier et al (1996) suggest that sulfate above 20mg/L could compete with the chlorinated solvents as an electron acceptor and thus retard the biodegradation process of the latter. Given that sulfate was found at 22mg/L in the source area and at higher levels away from the source, it can be deduced that sulfate may be retarding the amount of biodegradation of carbon tet occurring at IHSS 118.1. Because sulfate is a key indicator of the efficacy of biodegradation on chlorinated solvents, continued sampling is advised.

4.0 METABOLIC BY-PRODUCTS

The measurement of the metabolic by-products of biodegradation are valuable to determine the predominant microbial and chemical processes that are occurring at IHSS 118.1. The following samples were taken to help determine whether actual biodegradation is occurring.

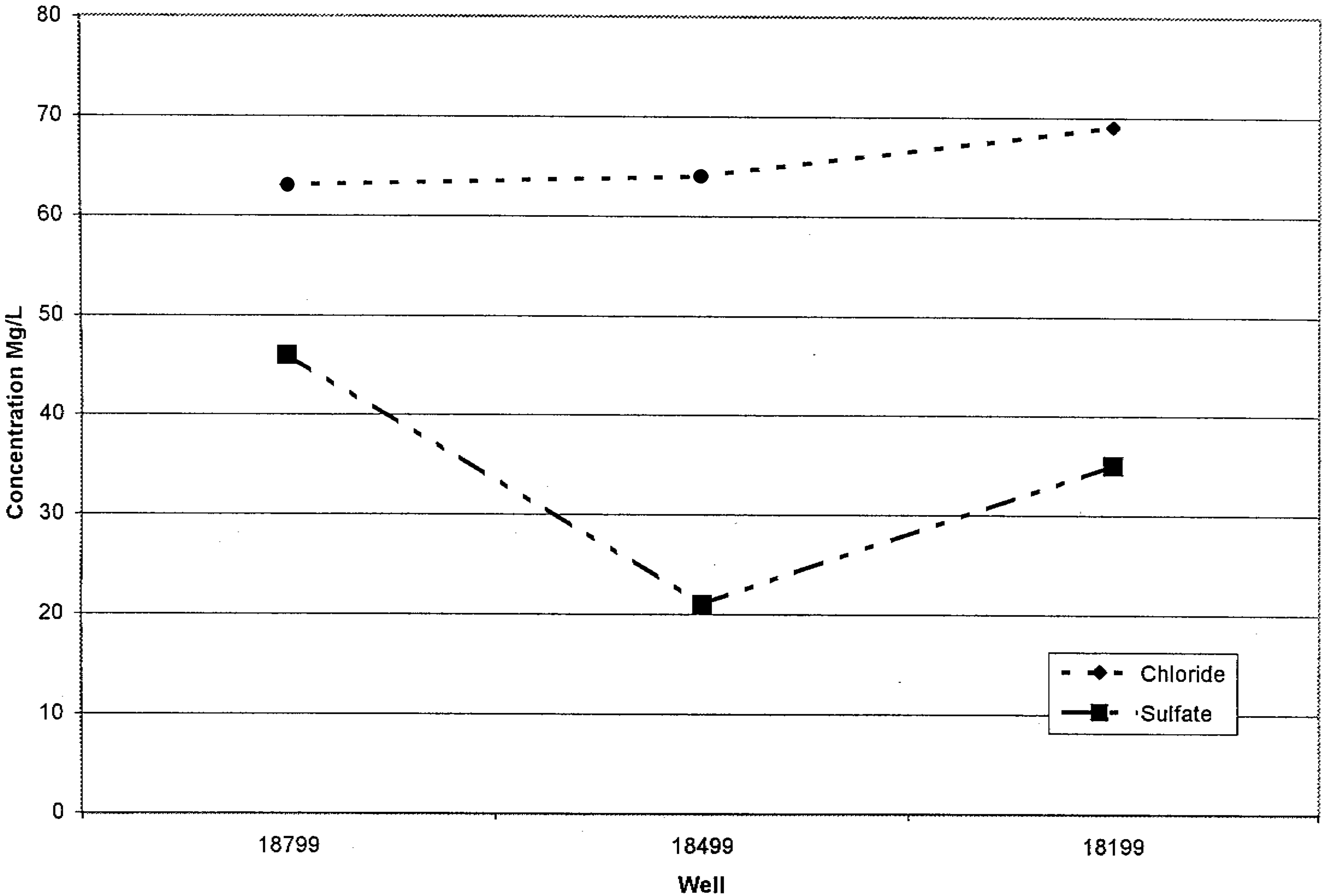
4.1 Ferrous Iron

Ferric iron (Fe III) is reduced to ferrous iron Fe(II) during anaerobic biodegradation of organic hydrocarbons. Therefore an increase in Fe(II) concentration in the source area can suggest the amount of biodegradation that is occurring. Figure 2 shows that Fe(II) increases from 0.01 mg/L in background well 18799 to 1.6 mg/L in source well 18499, then decreases to 0.10 mg/L in downgradient well 18199. Wiedemeier et al (1996) believe that Fe(II) above 1 mg/L would allow reductive dechlorination to take place. Therefore it appears that some reductive dechlorination is occurring at the source. Because Fe(II) is a key indicator of the efficacy of biodegradation on chlorinated solvents, continued sampling is advised.

4.2 Sulfide

The production of hydrogen sulfide occurs during sulfate reduction and verifies that sulfate is acting as an electron acceptor during biodegradation. Figure 2 shows that sulfide is 0.02 mg/L in background well 18799 and does not change in concentration in the source and downgradient wells. Wiedemeier et al (1996) believe that sulfide above 1 mg/L would allow reductive dechlorination to take place. These results suggest that though sulfate is decreasing in concentration in the source area, the amount of hydrogen sulfide generated is minimal. Because of the conflicting evidence for biodegradation given by sulfate/sulfide analyses, and because sulfide is a key indicator of the efficacy of biodegradation on chlorinated solvents, continued sampling is advised.

Figure 5
Chloride and Sulfate Concentrations at IHSS 118.1



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4.3 Methane

The presence of methane in groundwater is indicative of strongly reducing conditions. Methane is produced through the biodegradation of petroleum hydrocarbons, and where present in groundwater containing chlorinated solvents, suggests that the chemistry of the groundwater is favorable for reductive dechlorination. Figure 4 shows that methane increase from 0.003 mg/L to 0.20 mg/L in the source area, then decreasing to 0.007 in downgradient well 18199. Wiedemeier et al (1996) believe that methane above 0.1 mg/L would allow reductive dechlorination to take place. Methane values are fairly low suggesting that there is little if any petroleum hydrocarbons present at IHSS 118.1. However, the increase in methane production in the source relative to background suggests that some reductive dechlorination is occurring. Because methane is a key indicator of the efficacy of biodegradation on chlorinated solvents, continued sampling is advised.

4.4 Chloride

The presence of elevated concentrations of chloride in groundwater relative to background suggests that biodegradation of organic solvents is taking place. This is because the replacement of hydrogen for chlorine in the chemical structure of the chlorinated organic compound during reductive dechlorination, releases chlorine in the process. Figure 5 shows the concentrations of chloride seen in the vicinity of IHSS 118.1. Chloride concentration is in the 65 mg/L range and does not change appreciably in the three wells plotted, although side gradient well 18699 does show twice the concentration of chloride relative to the other wells. The RFETS background mean concentrations for chloride in alluvial materials is 8 to 18 mg/L (EG&G, 1993). The Groundwater Geochemistry Report for RFETS (EG&G, 1995) shows that chloride concentration increases from west to east at RFETS and that chloride concentrations in the Industrial area range from 25 to 100 mg/L. Given the lack of dramatic change in chloride concentration at IHSS 118.1 relative to both upgradient and downgradient wells and the surrounding industrial area, it may be that only limited reductive dechlorination is occurring at the IHSS. Because chloride is a key indicator of the efficacy of biodegradation on chlorinated solvents, and given the equivocal nature of results, continued sampling is advised.

5.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the preliminary results, a number of conclusions can be made. There is evidence of biodegradation at the IHSS 118.1 source. If the assumption is made that the breakdown products found at IHSS 118.1 are not part of the original free product composition, then based on the scoring system discussed in Wiedemeier et al (1996), the source area rates a score of 18 (see Appendix B). The upgradient and downgradient wells rate a score of 3, which suggests that the environment of the aquifer away from the source may be hostile to biodegradation. These scores are derived using data from the three wells used for the cross section discussed above. Given the downgradient score with respect to biodegradation, the decrease in composition of organic solvents away from the source must be partly attributed to physical processes such as dilution and diffusion rather than strictly to biodegradation. These preliminary results suggest that a significant reduction in carbon tet is occurring at the source. Additional monitoring will help determine the rate at which biodegradation is occurring.

One of the footing drain outfalls shows low levels of carbon tet and chloroform that is probably attributable to inflow of carbon tet plume groundwater into the footing drain system. Given the low concentration of VOCs in outfall sample 771-FDOUT2, and the very low flow from the outfall, there does not appear to be a major contribution of VOCs to surface water.

The results of the follow-on sampling at IHSS 118.1 will be used to validate these preliminary findings and can also be used to assess possible remedial strategies. The Groundwater program will be evaluating the downgradient extent of VOC plumes in the industrial area in the future to determine potential impacts to surface water. This information will be incorporated with data from IHSS 118.1 and other projects to provide an integrated approach to groundwater management for the Site.

5.1 Sampling Recommendations

Based on the results obtained to date the following recommendations can be made with respect to future sampling:

1. The present sampling suite should be maintained for the second round of sampling, to confirm the results obtained in the first sampling event. After that point, it would be prudent to eliminate the semivolatile organic suite and TOC sample. The semivolatile organic suite was collected to determine whether there is evidence of fuel hydrocarbons that would aid in the breakdown of carbon tet. Because these compounds were not encountered, the analyses can be discontinued. TOC can be eliminated because only DOC is used in the scoring system for determining the degree of biodegradation.
2. Efforts will be increased to assure the collection of representative DO measurements because it is a critical parameter for determining whether biodegradation can succeed. Down-hole parameter probes will be used for collecting DO in the next sample round.

3. The two Building 771 outfall locations should also be sampled again to confirm the initial results obtained in the first round of sampling. In addition, a check will be made to see if the outfall with detectable concentrations of VOCs is active or has been abandoned.

6.0 REFERENCES

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Appendix A
Select IHSS 118.1 Lab Data

Location	Sample Date	Sample #	Analyte	Result Type	Result	Units	Lab Qual	Det Lim	Dilution	Valid	QC Type
05497	3/8/99	GW06305TE	1,1-DICHLOROETHANE	TR1	250000	UG/L	U	250000	800	V1	REAL
05497	3/8/99	GW06305TE	1,1-DICHLOROETHANE	DL1	0.50E+08	UG/L	U	0.50E+08	160000	1	REAL
18199	3/24/99	GW06283TE	1,1-DICHLOROETHANE	TR1	0.89	UG/L	J	5.0	1	UJ	REAL
18199	3/24/99	GW06283TE	1,1-DICHLOROETHANE	DL1	1000	UG/L	U	1000	200		REAL
18299	3/17/99	GW06284TE	1,1-DICHLOROETHANE	TR1	0.60	UG/L	J	5.0	1		REAL
18299	3/17/99	GW06284TE	1,1-DICHLOROETHANE	DL1	500	UG/L	U	500	100		REAL
18399	3/26/99	GW06285TE	1,1-DICHLOROETHANE	TR1	1250	UG/L	U	1250	250	UJ	REAL
18399	3/26/99	GW06285TE	1,1-DICHLOROETHANE	DL1	2500	UG/L	U	2500	500		REAL
18499	3/18/99	GW06286TE	1,1-DICHLOROETHANE	TR1	1.4	UG/L	J	5.0	1		REAL
18499	3/18/99	GW06286TE	1,1-DICHLOROETHANE	DL1	5000	UG/L	U	5000	1000		REAL
18599	3/2/99	GW06289TE	1,1-DICHLOROETHANE	TR1	1200000	UG/L	U	1200000	4000	V1	REAL
18599	3/2/99	GW06289TE	1,1-DICHLOROETHANE	DL1	0.50E+08	UG/L	U	0.50E+08	160000	1	REAL
18599	3/18/99	GW06307TE	1,1-DICHLOROETHANE	TR1	2.4	UG/L	J	5.0	1		REAL
18599	3/18/99	GW06307TE	1,1-DICHLOROETHANE	DL1	2500	UG/L	U	2500	500		REAL
18699	3/22/99	GW06290TE	1,1-DICHLOROETHANE	TR1	1.5	UG/L	J	5.0	1		REAL
18699	3/22/99	GW06309TE	1,1-DICHLOROETHANE	TR1	1.4	UG/L	J	5.0	1		DUP
18699	3/22/99	GW06310TE	1,1-DICHLOROETHANE	TR1	5.0	UG/L	U	5.0	1		RNS
18799	3/26/99	GW06291TE	1,1-DICHLOROETHANE	TR1	50.0	UG/L	U	50.0	10.0	UJ	REAL
771 FD OUT #2	3/26/99	GW06313TE	1,1-DICHLOROETHANE	TR1	5	UG/L	U	5	1		REAL
771 Manhole #3	3/26/99	GW06312TE	1,1-DICHLOROETHANE	TR1	5	UG/L	U	5	1		REAL
MW 771 Manhole	3/30/99	GW06318TE	1,1-DICHLOROETHANE	TR1	5	UG/L	U	5	1		REAL
05497	3/8/99	GW06305TE	1,1-DICHLOROETHENE	TR1	250000	UG/L	U	250000	800	V1	REAL
05497	3/8/99	GW06305TE	1,1-DICHLOROETHENE	DL1	0.50E+08	UG/L	U	0.50E+08	160000	1	REAL
18199	3/24/99	GW06283TE	1,1-DICHLOROETHENE	TR1	1.6	UG/L	J	5.0	1	UJ	REAL
18199	3/24/99	GW06283TE	1,1-DICHLOROETHENE	DL1	1000	UG/L	U	1000	200		REAL
18299	3/17/99	GW06284TE	1,1-DICHLOROETHENE	TR1	5.0	UG/L	U	5.0	1		REAL
18299	3/17/99	GW06284TE	1,1-DICHLOROETHENE	DL1	500	UG/L	U	500	100		REAL
18399	3/26/99	GW06285TE	1,1-DICHLOROETHENE	TR1	1250	UG/L	U	1250	250	UJ	REAL
18399	3/26/99	GW06285TE	1,1-DICHLOROETHENE	DL1	2500	UG/L	U	2500	500		REAL
18499	3/18/99	GW06286TE	1,1-DICHLOROETHENE	TR1	2.3	UG/L	J	5.0	1		REAL
18499	3/18/99	GW06286TE	1,1-DICHLOROETHENE	DL1	5000	UG/L	U	5000	1000		REAL
18599	3/2/99	GW06289TE	1,1-DICHLOROETHENE	TR1	1200000	UG/L	U	1200000	4000	V1	REAL
18599	3/2/99	GW06289TE	1,1-DICHLOROETHENE	DL1	0.50E+08	UG/L	U	0.50E+08	160000	1	REAL
18599	3/18/99	GW06307TE	1,1-DICHLOROETHENE	TR1	3.5	UG/L	J	5.0	1		REAL
18599	3/18/99	GW06307TE	1,1-DICHLOROETHENE	DL1	2500	UG/L	U	2500	500		REAL
18699	3/22/99	GW06290TE	1,1-DICHLOROETHENE	TR1	1.2	UG/L	J	5.0	1		REAL
18699	3/22/99	GW06309TE	1,1-DICHLOROETHENE	TR1	1.1	UG/L	J	5.0	1		DUP
18699	3/22/99	GW06310TE	1,1-DICHLOROETHENE	TR1	5.0	UG/L	U	5.0	1		RNS
18799	3/26/99	GW06291TE	1,1-DICHLOROETHENE	TR1	6.8	UG/L	J	50.0	10.0	UJ	REAL
771 FD OUT #2	3/26/99	GW06313TE	1,1-DICHLOROETHENE	TR1	1	UG/L	J	5	1		REAL
771 Manhole #3	3/26/99	GW06312TE	1,1-DICHLOROETHENE	TR1	5	UG/L	U	5	1		REAL
MW 771 Manhole	3/30/99	GW06318TE	1,1-DICHLOROETHENE	TR1	5	UG/L	U	5	1		REAL
18199	3/24/99	GW06283TE	ANTHRACENE	TR1	9.9	UG/L	U	9.9	1	V1	REAL
18299	3/17/99	GW06284TE	ANTHRACENE	TR1	10.0	UG/L	U	10.0	1		REAL
18399	3/29/99	GW06285TE	ANTHRACENE	TR1	10	UG/L	U	10	1		REAL
18499	3/18/99	GW06286TE	ANTHRACENE	DL1	40.0	UG/L	U	40.0	4		REAL
18599	3/18/99	GW06307TE	ANTHRACENE	TR1	10.0	UG/L	U	10.0	1		REAL
18699	3/22/99	GW06290TE	ANTHRACENE	TR1	9.5	UG/L	U	9.5	1	UJ	REAL
18699	3/22/99	GW06309TE	ANTHRACENE	TR1	9.5	UG/L	U	9.5	1	UJ	DUP
18699	3/22/99	GW06310TE	ANTHRACENE	TR1	9.1	UG/L	U	9.1	1	U	RNS
18799	3/29/99	GW06291TE	ANTHRACENE	TR1	10	UG/L	U	10	1		REAL
05497	3/8/99	GW06305TE	BENZENE	TR1	250000	UG/L	U	250000	800	UJ1	REAL
05497	3/8/99	GW06305TE	BENZENE	DL1	0.50E+08	UG/L	U	0.50E+08	160000	1	REAL
18199	3/24/99	GW06283TE	BENZENE	TR1	5.0	UG/L	U	5.0	1	UJ	REAL
18199	3/24/99	GW06283TE	BENZENE	DL1	1000	UG/L	U	1000	200		REAL
18299	3/17/99	GW06284TE	BENZENE	TR1	5.0	UG/L	U	5.0	1		REAL
18299	3/17/99	GW06284TE	BENZENE	DL1	500	UG/L	U	500	100		REAL
18399	3/26/99	GW06285TE	BENZENE	TR1	1250	UG/L	U	1250	250	UJ	REAL
18399	3/26/99	GW06285TE	BENZENE	DL1	2500	UG/L	U	2500	500		REAL
18499	3/18/99	GW06286TE	BENZENE	TR1	5.0	UG/L	U	5.0	1		REAL
18499	3/18/99	GW06286TE	BENZENE	DL1	5000	UG/L	U	5000	1000		REAL
18599	3/2/99	GW06289TE	BENZENE	TR1	1200000	UG/L	U	1200000	4000	UJ1	REAL
18599	3/2/99	GW06289TE	BENZENE	DL1	0.50E+08	UG/L	U	0.50E+08	160000	1	REAL
18599	3/18/99	GW06307TE	BENZENE	TR1	5.0	UG/L	U	5.0	1		REAL
18599	3/18/99	GW06307TE	BENZENE	DL1	2500	UG/L	U	2500	500		REAL
18699	3/22/99	GW06290TE	BENZENE	TR1	5.0	UG/L	U	5.0	1		REAL
18699	3/22/99	GW06309TE	BENZENE	TR1	5.0	UG/L	U	5.0	1		DUP
18699	3/22/99	GW06310TE	BENZENE	TR1	5.0	UG/L	U	5.0	1		RNS
18799	3/26/99	GW06291TE	BENZENE	TR1	50.0	UG/L	U	50.0	10.0	UJ	REAL
771 FD OUT #2	3/26/99	GW06313TE	BENZENE	TR1	5	UG/L	U	5	1		REAL
771 Manhole #3	3/26/99	GW06312TE	BENZENE	TR1	5	UG/L	U	5	1		REAL
MW 771 Manhole	3/30/99	GW06318TE	BENZENE	TR1	5	UG/L	U	5	1		REAL
18199	3/24/99	GW06283TE	CARBON DISULFIDE	TR1	5.0	UG/L	U	5.0	1	UJ	REAL
18199	3/24/99	GW06283TE	CARBON DISULFIDE	DL1	1000	UG/L	U	1000	200		REAL

Appendix A
Select IHSS 118.1 Lab Data

Location	Sample Date	Sample #	Analyte	Result Type	Result	Units	Lab Qual	Det Lim	Dilution	Valid	QC Type
18299	3/17/99	GW06284TE	CARBON DISULFIDE	TR1	5.0	UG/L	U	5.0	1		REAL
18299	3/17/99	GW06284TE	CARBON DISULFIDE	DL1	500	UG/L	U	500	100		REAL
18399	3/26/99	GW06285TE	CARBON DISULFIDE	TR1	1250	UG/L	U	1250	250	UJ	REAL
18399	3/26/99	GW06285TE	CARBON DISULFIDE	DL1	2500	UG/L	U	2500	500		REAL
18499	3/18/99	GW06286TE	CARBON DISULFIDE	TR1	361	UG/L		5.0	1		REAL
18499	3/18/99	GW06286TE	CARBON DISULFIDE	DL1	5000	UG/L	U	5000	1000		REAL
18599	3/18/99	GW06307TE	CARBON DISULFIDE	TR1	26.9	UG/L		5.0	1		REAL
18599	3/18/99	GW06307TE	CARBON DISULFIDE	DL1	2500	UG/L	U	2500	500		REAL
18699	3/22/99	GW06290TE	CARBON DISULFIDE	TR1	5.0	UG/L	U	5.0	1		REAL
18699	3/22/99	GW06309TE	CARBON DISULFIDE	TR1	5.0	UG/L	U	5.0	1		DUP
18699	3/22/99	GW06310TE	CARBON DISULFIDE	TR1	5.0	UG/L	U	5.0	1		RNS
18799	3/26/99	GW06291TE	CARBON DISULFIDE	TR1	50.0	UG/L	U	50.0	10.0	UJ	REAL
771 FD OUT #2	3/26/99	GW06313TE	CARBON DISULFIDE	TR1	5	UG/L	U	5	1		REAL
771 Manhole #3	3/26/99	GW06312TE	CARBON DISULFIDE	TR1	5	UG/L	U	5	1		REAL
MW 771 Manhole	3/30/99	GW06318TE	CARBON DISULFIDE	TR1	5	UG/L	U	5	1		REAL
05497	3/8/99	GW06305TE	CARBON TETRACHLORIDE	DL1	0.69E+09	UG/L	D	0.50E+08	160000	V1	REAL
05497	3/8/99	GW06305TE	CARBON TETRACHLORIDE	TR1	0.53E+08	UG/L	E	250000	800	1	REAL
18199	3/24/99	GW06283TE	CARBON TETRACHLORIDE	TR1	2050	UG/L	E	5.0	1	UJ	REAL
18199	3/24/99	GW06283TE	CARBON TETRACHLORIDE	DL1	15400	UG/L	D	1000	200		REAL
18299	3/17/99	GW06284TE	CARBON TETRACHLORIDE	TR1	2520	UG/L	E	5.0	1		REAL
18299	3/17/99	GW06284TE	CARBON TETRACHLORIDE	DL1	3280	UG/L	D	500	100		REAL
18399	3/26/99	GW06285TE	CARBON TETRACHLORIDE	TR1	28100	UG/L	E	1250	250	UJ	REAL
18399	3/26/99	GW06285TE	CARBON TETRACHLORIDE	DL1	23000	UG/L	D	2500	500		REAL
18499	3/18/99	GW06286TE	CARBON TETRACHLORIDE	TR1	9540	UG/L	E	5.0	1		REAL
18499	3/18/99	GW06286TE	CARBON TETRACHLORIDE	DL1	57800	UG/L	D	5000	1000		REAL
18599	3/2/99	GW06289TE	CARBON TETRACHLORIDE	DL1	0.67E+09	UG/L	D	0.50E+08	160000	V1	REAL
18599	3/2/99	GW06289TE	CARBON TETRACHLORIDE	TR1	0.16E+09	UG/L	E	1200000	4000	1	REAL
18599	3/18/99	GW06307TE	CARBON TETRACHLORIDE	TR1	6520	UG/L	E	5.0	1		REAL
18599	3/18/99	GW06307TE	CARBON TETRACHLORIDE	DL1	31900	UG/L	D	2500	500		REAL
18699	3/22/99	GW06290TE	CARBON TETRACHLORIDE	TR1	4.7	UG/L	J	5.0	1		REAL
18699	3/22/99	GW06309TE	CARBON TETRACHLORIDE	TR1	4.2	UG/L	J	5.0	1		DUP
18699	3/22/99	GW06310TE	CARBON TETRACHLORIDE	TR1	5.0	UG/L	U	5.0	1		RNS
18799	3/26/99	GW06291TE	CARBON TETRACHLORIDE	TR1	927	UG/L		50.0	10.0	UJ	REAL
771 FD OUT #2	3/26/99	GW06313TE	CARBON TETRACHLORIDE	TR1	12	UG/L		5	1		REAL
771 Manhole #3	3/26/99	GW06312TE	CARBON TETRACHLORIDE	TR1	5	UG/L	U	5	1		REAL
MW 771 Manhole	3/30/99	GW06318TE	CARBON TETRACHLORIDE	TR1	5	UG/L	U	5	1		REAL
18199	3/17/99	GW06283TE	CHLORIDE	TR1	69	MG/L		0.5	5		REAL
18299	3/17/99	GW06284TE	CHLORIDE	TR1	57	MG/L		0.5	5		REAL
18399	3/17/99	GW06285TE	CHLORIDE	TR1	76	MG/L		0.5	5		REAL
18499	3/17/99	GW06286TE	CHLORIDE	TR1	64	MG/L		0.5	5		REAL
18599	3/17/99	GW06307TE	CHLORIDE	TR1	54	MG/L		0.5	2		REAL
18699	3/17/99	GW06290TE	CHLORIDE	TR1	120	MG/L		0.5	5	V1	REAL
18699	3/17/99	GW06309TE	CHLORIDE	TR1	120	MG/L		0.5	5	V1	DUP
18699	3/23/99	GW06310TE	CHLORIDE	TR1	0.5	MG/L	U	0.5		V1	RNS
18799	3/17/99	GW06291TE	CHLORIDE	TR1	63	MG/L		0.5	5		REAL
05497	3/8/99	GW06305TE	CHLOROFORM	TR1	9900000	UG/L		250000	800	V1	REAL
05497	3/8/99	GW06305TE	CHLOROFORM	DL1	0.50E+08	UG/L	U	0.50E+08	160000	1	REAL
18199	3/24/99	GW06283TE	CHLOROFORM	TR1	1220	UG/L	EB	5.0	1	UJ	REAL
18199	3/24/99	GW06283TE	CHLOROFORM	DL1	2200	UG/L	DB	1000	200		REAL
18299	3/17/99	GW06284TE	CHLOROFORM	TR1	1280	UG/L	E	5.0	1		REAL
18299	3/17/99	GW06284TE	CHLOROFORM	DL1	1600	UG/L	D	500	100		REAL
18399	3/26/99	GW06285TE	CHLOROFORM	TR1	3540	UG/L	B	1250	250	UJ	REAL
18399	3/26/99	GW06285TE	CHLOROFORM	DL1	3430	UG/L	DB	2500	500		REAL
18499	3/18/99	GW06286TE	CHLOROFORM	TR1	4810	UG/L	E	5.0	1		REAL
18499	3/18/99	GW06286TE	CHLOROFORM	DL1	8750	UG/L	D	5000	1000		REAL
18599	3/2/99	GW06289TE	CHLOROFORM	TR1	4300000	UG/L		1200000	4000	V1	REAL
18599	3/2/99	GW06289TE	CHLOROFORM	DL1	0.50e+08	UG/L	U	0.50E+08	160000	1	REAL
18599	3/18/99	GW06307TE	CHLOROFORM	TR1	2490	UG/L	E	5.0	1		REAL
18599	3/18/99	GW06307TE	CHLOROFORM	DL1	3520	UG/L	D	2500	500		REAL
18699	3/22/99	GW06290TE	CHLOROFORM	TR1	0.58	UG/L	JB	5.0	1		REAL
18699	3/22/99	GW06309TE	CHLOROFORM	TR1	0.50	UG/L	JB	5.0	1		DUP
18699	3/22/99	GW06310TE	CHLOROFORM	TR1	5.0	UG/L	U	5.0	1		RNS
18799	3/26/99	GW06291TE	CHLOROFORM	TR1	511	UG/L	B	50.0	10.0	UJ	REAL
771 FD OUT #2	3/26/99	GW06313TE	CHLOROFORM	TR1	23	UG/L		5	1		REAL
771 Manhole #3	3/26/99	GW06312TE	CHLOROFORM	TR1	5	UG/L	U	5	1		REAL
MW 771 Manhole	3/30/99	GW06318TE	CHLOROFORM	TR1	5	UG/L	U	5	1		REAL
05497	3/8/99	GW06305TE	CHLOROMETHANE	TR1	500000	UG/L	U	500000	800	V1	REAL
05497	3/8/99	GW06305TE	CHLOROMETHANE	DL1	0.10E+09	UG/L	U	0.10E+09	160000	1	REAL
18199	3/24/99	GW06283TE	CHLOROMETHANE	TR1	5.0	UG/L	U	5.0	1	UJ	REAL
18199	3/24/99	GW06283TE	CHLOROMETHANE	DL1	1000	UG/L	U	1000	200		REAL
18299	3/17/99	GW06284TE	CHLOROMETHANE	TR1	2.0	UG/L	J	5.0	1		REAL
18299	3/17/99	GW06284TE	CHLOROMETHANE	DL1	500	UG/L	U	500	100		REAL
18399	3/26/99	GW06285TE	CHLOROMETHANE	TR1	1250	UG/L	U	1250	250	UJ	REAL
18399	3/26/99	GW06285TE	CHLOROMETHANE	DL1	2500	UG/L	U	2500	500		REAL

Appendix A
Select IHSS 118.1 Lab Data

Location	Sample Date	Sample #	Analyte	Result Type	Result	Units	Lab Qual	Det Lim	Dilution	Valid	QC Type
18499	3/18/99	GW06286TE	CHLOROMETHANE	TR1	8.9	UG/L		5.0	1		REAL
18499	3/18/99	GW06286TE	CHLOROMETHANE	DL1	5000	UG/L	U	5000	1000		REAL
18599	3/2/99	GW06289TE	CHLOROMETHANE	TR1	2500000	UG/L	U	2500000	4000	V1	REAL
18599	3/2/99	GW06289TE	CHLOROMETHANE	DL1	0.10E+09	UG/L	U	0.10E+09	160000	1	REAL
18599	3/18/99	GW06307TE	CHLOROMETHANE	TR1	18.2	UG/L		5.0	1		REAL
18599	3/18/99	GW06307TE	CHLOROMETHANE	DL1	2500	UG/L	U	2500	500		REAL
18699	3/22/99	GW06290TE	CHLOROMETHANE	TR1	5.0	UG/L	U	5.0	1		REAL
18699	3/22/99	GW06309TE	CHLOROMETHANE	TR1	5.0	UG/L	U	5.0	1		DUP
18699	3/22/99	GW06310TE	CHLOROMETHANE	TR1	5.0	UG/L	U	5.0	1		RNS
18799	3/26/99	GW06291TE	CHLOROMETHANE	TR1	50.0	UG/L	J	50.0	10.0	UJ	REAL
771 FD OUT #2	3/26/99	GW06313TE	CHLOROMETHANE	TR1	10	UG/L	U	10	1		REAL
771 Manhole #3	3/26/99	GW06312TE	CHLOROMETHANE	TR1	10	UG/L	U	10	1		REAL
MW 771 Manhole	3/30/99	GW06318TE	CHLOROMETHANE	TR1	10	UG/L	U	10	1		REAL
18199	3/24/99	GW06283TE	CHRYSENE	TR1	9.9	UG/L	U	9.9	1	V1	REAL
18299	3/17/99	GW06284TE	CHRYSENE	TR1	10.0	UG/L	U	10.0	1		REAL
18399	3/29/99	GW06285TE	CHRYSENE	TR1	10	UG/L	U	10	1		REAL
18499	3/18/99	GW06286TE	CHRYSENE	DL1	40.0	UG/L	U	40.0	4		REAL
18599	3/18/99	GW06307TE	CHRYSENE	TR1	10.0	UG/L	U	10.0	1		REAL
18699	3/22/99	GW06290TE	CHRYSENE	TR1	9.5	UG/L	U	9.5	1	UJ	REAL
18699	3/22/99	GW06309TE	CHRYSENE	TR1	9.5	UG/L	U	9.5	1	UJ	DUP
18699	3/22/99	GW06310TE	CHRYSENE	TR1	9.1	UG/L	U	9.1	1	U	RNS
18799	3/29/99	GW06291TE	CHRYSENE	TR1	10	UG/L	U	10	1		REAL
05497	3/8/99	GW06305TE	cis-1,2-DICHLOROETHENE	TR1	250000	UG/L	U	250000	800	V1	REAL
05497	3/8/99	GW06305TE	cis-1,2-DICHLOROETHENE	DL1	0.50E+08	UG/L	U	0.50E+08	160000	1	REAL
18199	3/24/99	GW06283TE	cis-1,2-DICHLOROETHENE	TR1	5.0	UG/L	U	5.0	1	UJ	REAL
18199	3/24/99	GW06283TE	cis-1,2-DICHLOROETHENE	DL1	1000	UG/L	U	1000	200		REAL
18299	3/17/99	GW06284TE	cis-1,2-DICHLOROETHENE	TR1	5.0	UG/L	U	5.0	1		REAL
18299	3/17/99	GW06284TE	cis-1,2-DICHLOROETHENE	DL1	500	UG/L	U	500	100		REAL
18399	3/26/99	GW06285TE	cis-1,2-DICHLOROETHENE	TR1	1250	UG/L	U	1250	250	UJ	REAL
18399	3/26/99	GW06285TE	cis-1,2-DICHLOROETHENE	DL1	2500	UG/L	U	2500	500		REAL
18499	3/18/99	GW06286TE	cis-1,2-DICHLOROETHENE	TR1	1.6	UG/L	J	5.0	1		REAL
18499	3/18/99	GW06286TE	cis-1,2-DICHLOROETHENE	DL1	5000	UG/L	U	5000	1000		REAL
18599	3/2/99	GW06289TE	cis-1,2-DICHLOROETHENE	TR1	1200000	UG/L	U	1200000	4000	V1	REAL
18599	3/2/99	GW06289TE	cis-1,2-DICHLOROETHENE	DL1	0.50E+08	UG/L	U	0.50E+08	160000	1	REAL
18599	3/18/99	GW06307TE	cis-1,2-DICHLOROETHENE	TR1	0.56	UG/L	J	5.0	1		REAL
18599	3/18/99	GW06307TE	cis-1,2-DICHLOROETHENE	DL1	2500	UG/L	U	2500	500		REAL
18699	3/22/99	GW06290TE	cis-1,2-DICHLOROETHENE	TR1	5.0	UG/L	U	5.0	1		REAL
18699	3/22/99	GW06309TE	cis-1,2-DICHLOROETHENE	TR1	5.0	UG/L	U	5.0	1		DUP
18699	3/22/99	GW06310TE	cis-1,2-DICHLOROETHENE	TR1	5.0	UG/L	U	5.0	1		RNS
18799	3/26/99	GW06291TE	cis-1,2-DICHLOROETHENE	TR1	50.0	UG/L	U	50.0	10.0	UJ	REAL
771 FD OUT #2	3/26/99	GW06313TE	cis-1,2-DICHLOROETHENE	TR1	5	UG/L	U	5	1		REAL
771 Manhole #3	3/26/99	GW06312TE	cis-1,2-DICHLOROETHENE	TR1	5	UG/L	U	5	1		REAL
MW 771 Manhole	3/30/99	GW06318TE	cis-1,2-DICHLOROETHENE	TR1	5	UG/L	U	5	1		REAL
18199	3/17/99	GW06283TE	DISS. ORGANIC CARBON	TR1	4	MG/L		1			REAL
18199	3/17/99	GW06283TE	DISS. ORGANIC CARBON	TR1	3	MG/L		1			REAL
18299	3/17/99	GW06284TE	DISS. ORGANIC CARBON	TR1	4	MG/L		1			REAL
18299	3/17/99	GW06284TE	DISS. ORGANIC CARBON	TR1	6	MG/L		1			REAL
18399	3/17/99	GW06285TE	DISS. ORGANIC CARBON	TR1	3	MG/L		1			REAL
18399	3/17/99	GW06285TE	DISS. ORGANIC CARBON	TR1	4	MG/L		1			REAL
18499	3/17/99	GW06286TE	DISS. ORGANIC CARBON	TR1	4	MG/L		1			REAL
18499	3/17/99	GW06286TE	DISS. ORGANIC CARBON	TR1	4	MG/L		1			REAL
18599	3/17/99	GW06307TE	DISS. ORGANIC CARBON	TR1	3	MG/L		1			REAL
18599	3/17/99	GW06307TE	DISS. ORGANIC CARBON	TR1	4	MG/L		1			REAL
18699	3/17/99	GW06290TE	DISS. ORGANIC CARBON	TR1	3	MG/L		1		V1	REAL
18699	3/17/99	GW06290TE	DISS. ORGANIC CARBON	TR1	5	MG/L		1		V1	REAL
18699	3/17/99	GW06309TE	DISS. ORGANIC CARBON	TR1	6	MG/L		1		V1	DUP
18699	3/17/99	GW06309TE	DISS. ORGANIC CARBON	TR1	3	MG/L		1		V1	DUP
18699	3/23/99	GW06310TE	DISS. ORGANIC CARBON	TR1	2	MG/L		1		V1	RNS
18699	3/23/99	GW06310TE	DISS. ORGANIC CARBON	TR1	1	MG/L	U	1		V1	RNS
18799	3/17/99	GW06291TE	DISS. ORGANIC CARBON	TR1	3	MG/L		1			REAL
18799	3/17/99	GW06291TE	DISS. ORGANIC CARBON	TR1	4	MG/L		1			REAL
05497	3/8/99	GW06305TE	ETHYLBENZENE	TR1	250000	UG/L	U	250000	800	UJ1	REAL
05497	3/8/99	GW06305TE	ETHYLBENZENE	DL1	0.50E+08	UG/L	U	0.50E+08	160000	1	REAL
18199	3/24/99	GW06283TE	ETHYLBENZENE	TR1	5.0	UG/L	U	5.0	1	UJ	REAL
18199	3/24/99	GW06283TE	ETHYLBENZENE	DL1	1000	UG/L	U	1000	200		REAL
18299	3/17/99	GW06284TE	ETHYLBENZENE	TR1	5.0	UG/L	U	5.0	1		REAL
18299	3/17/99	GW06284TE	ETHYLBENZENE	DL1	500	UG/L	U	500	100		REAL
18399	3/26/99	GW06285TE	ETHYLBENZENE	TR1	1250	UG/L	U	1250	250	UJ	REAL
18399	3/26/99	GW06285TE	ETHYLBENZENE	DL1	2500	UG/L	U	2500	500		REAL
18499	3/18/99	GW06286TE	ETHYLBENZENE	TR1	5.0	UG/L	U	5.0	1		REAL
18499	3/18/99	GW06286TE	ETHYLBENZENE	DL1	5000	UG/L	U	5000	1000		REAL
18599	3/2/99	GW06289TE	ETHYLBENZENE	TR1	1200000	UG/L	U	1200000	4000	UJ1	REAL
18599	3/2/99	GW06289TE	ETHYLBENZENE	DL1	0.50E+08	UG/L	U	0.50E+08	160000	1	REAL
18599	3/18/99	GW06307TE	ETHYLBENZENE	TR1	5.0	UG/L	U	5.0	1		REAL

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Appendix A
Select IHSS 118.1 Lab Data

Location	Sample Date	Sample #	Analyte	Result Type	Result	Units	Lab Qual	Det Lim	Dilution	Valid	QC Type
18599	3/18/99	GW06307TE	ETHYLBENZENE	DL1	2500	UG/L	U	2500	500		REAL
18699	3/22/99	GW06290TE	ETHYLBENZENE	TR1	5.0	UG/L	U	5.0	1		REAL
18699	3/22/99	GW06309TE	ETHYLBENZENE	TR1	5.0	UG/L	U	5.0	1		DUP
18699	3/22/99	GW06310TE	ETHYLBENZENE	TR1	5.0	UG/L	U	5.0	1		RNS
18799	3/26/99	GW06291TE	ETHYLBENZENE	TR1	50.0	UG/L	U	50.0	10.0	UJ	REAL
771 FD OUT #2	3/26/99	GW06313TE	ETHYLBENZENE	TR1	5	UG/L	U	5	1		REAL
771 Manhole #3	3/26/99	GW06312TE	ETHYLBENZENE	TR1	5	UG/L	U	5	1		REAL
MW 771 Manhole	3/30/99	GW06318TE	ETHYLBENZENE	TR1	5	UG/L	U	5	1		REAL
18199	3/24/99	GW06283TE	HEXACHLOROETHANE	TR1	36.4	UG/L	NJ		1		REAL
18199	3/24/99	GW06283TE	HEXACHLOROETHANE	TR1	12.6	UG/L		9.9	1	V1	REAL
18299	3/17/99	GW06284TE	HEXACHLOROETHANE	TR1	10.0	UG/L	U	10.0	1		REAL
18399	3/29/99	GW06285TE	HEXACHLOROETHANE	TR1	11	UG/L		10	1		REAL
18499	3/18/99	GW06286TE	HEXACHLOROETHANE	DL1	179	UG/L	D	179	4		REAL
18599	3/18/99	GW06307TE	HEXACHLOROETHANE	TR1	29.3	UG/L	J		1		REAL
18599	3/18/99	GW06307TE	HEXACHLOROETHANE	TR1	13.6	UG/L		10.0	1		REAL
18699	3/22/99	GW06290TE	HEXACHLOROETHANE	TR1	9.5	UG/L	U	9.5	1	UJ	REAL
18699	3/22/99	GW06309TE	HEXACHLOROETHANE	TR1	9.5	UG/L	U	9.5	1	UJ	DUP
18699	3/22/99	GW06310TE	HEXACHLOROETHANE	TR1	9.1	UG/L	U	9.1	1	U	RNS
18799	3/29/99	GW06291TE	HEXACHLOROETHANE	TR1	0.5	UG/L	J	10	1		REAL
18199	3/24/99	GW06283TE	METHANE	TR1	7.4	UG/L		6.4	1		REAL
18299	3/24/99	GW06284TE	METHANE	TR1	22	UG/L		6.4	1		REAL
18399	3/26/99	GW06285TE	METHANE	TR1	26	UG/L		6.4	1		REAL
18499	3/23/99	GW06286TE	METHANE	TR1	210	UG/L		6.4	1		REAL
18599	3/23/99	GW06307TE	METHANE	TR1	180	UG/L		6.4	1		REAL
18699	3/24/99	GW06290TE	METHANE	TR1	6.4	UG/L	U	6.4	1		REAL
18699	3/23/99	GW06309TE	METHANE	TR1	3.4	UG/L	J	6.4	1		DUP
18699	3/23/99	GW06310TE	METHANE	TR1	6.4	UG/L	U	6.4	1		RNS
18799	3/26/99	GW06291TE	METHANE	TR1	3.9	UG/L	J	6.4	1		REAL
18799	3/26/99	GW06291TE	METHANE	TR1	3.1	UG/L	J	6.4	1		LD
05497	3/8/99	GW06305TE	METHYLENE CHLORIDE	TR1	490000	UG/L	B	250000	800	V1	REAL
05497	3/8/99	GW06305TE	METHYLENE CHLORIDE	DL1	0.57E+08	UG/L	BD	0.50E+08	160000	1	REAL
18199	3/24/99	GW06283TE	METHYLENE CHLORIDE	TR1	12.6	UG/L	B	5.0	1	UJ	REAL
18199	3/24/99	GW06283TE	METHYLENE CHLORIDE	DL1	247	UG/L	DJB	1000	200		REAL
18299	3/17/99	GW06284TE	METHYLENE CHLORIDE	TR1	18.0	UG/L		5.0	1		REAL
18299	3/17/99	GW06284TE	METHYLENE CHLORIDE	DL1	500	UG/L	U	500	100		REAL
18399	3/26/99	GW06285TE	METHYLENE CHLORIDE	TR1	324	UG/L	JB	1250	250	JB	REAL
18399	3/26/99	GW06285TE	METHYLENE CHLORIDE	DL1	987	UG/L	DJB	2500	500		REAL
18499	3/18/99	GW06286TE	METHYLENE CHLORIDE	TR1	83.5	UG/L		5.0	1		REAL
18499	3/18/99	GW06286TE	METHYLENE CHLORIDE	DL1	5000	UG/L	U	5000	1000		REAL
18599	3/2/99	GW06289TE	METHYLENE CHLORIDE	TR1	2300000	UG/L	B	1200000	4000	V1	REAL
18599	3/2/99	GW06289TE	METHYLENE CHLORIDE	DL1	0.62E+08	UG/L	BD	0.50E+08	160000	1	REAL
18599	3/18/99	GW06307TE	METHYLENE CHLORIDE	TR1	47.4	UG/L		5.0	1		REAL
18599	3/18/99	GW06307TE	METHYLENE CHLORIDE	DL1	2500	UG/L	U	2500	500		REAL
18699	3/22/99	GW06290TE	METHYLENE CHLORIDE	TR1	0.84	UG/L	JB	5.0	1		REAL
18699	3/22/99	GW06309TE	METHYLENE CHLORIDE	TR1	5.0	UG/L	JB	5.0	1		DUP
18699	3/22/99	GW06310TE	METHYLENE CHLORIDE	TR1	5.0	UG/L	U	5.0	1		RNS
18799	3/26/99	GW06291TE	METHYLENE CHLORIDE	TR1	12.3	UG/L	JB	50.0	10.0	JB	REAL
771 FD OUT #2	3/26/99	GW06313TE	METHYLENE CHLORIDE	TR1	4	UG/L	JB	5	1		REAL
771 Manhole #3	3/26/99	GW06312TE	METHYLENE CHLORIDE	TR1	2	UG/L	BJ	5	1		REAL
MW 771 Manhole	3/30/99	GW06318TE	METHYLENE CHLORIDE	TR1	2	UG/L	JB	5	1		REAL
05497	3/8/99	GW06305TE	NAPHTHALENE	TR1	250000	UG/L	U	250000	800	UJ1	REAL
05497	3/8/99	GW06305TE	NAPHTHALENE	DL1	0.50E+08	UG/L	U	0.50E+08	160000	1	REAL
18199	3/24/99	GW06283TE	NAPHTHALENE	TR1	5.0	UG/L	U	5.0	1	UJ	REAL
18199	3/24/99	GW06283TE	NAPHTHALENE	DL1	1000	UG/L	U	1000	200		REAL
18199	3/24/99	GW06283TE	NAPHTHALENE	TR1	9.9	UG/L	U	9.9	1	V1	REAL
18299	3/17/99	GW06284TE	NAPHTHALENE	TR1	5.0	UG/L	U	5.0	1		REAL
18299	3/17/99	GW06284TE	NAPHTHALENE	TR1	10.0	UG/L	U	10.0	1		REAL
18299	3/17/99	GW06284TE	NAPHTHALENE	DL1	500	UG/L	U	500	100		REAL
18399	3/26/99	GW06285TE	NAPHTHALENE	TR1	1250	UG/L	U	1250	250	UJ	REAL
18399	3/26/99	GW06285TE	NAPHTHALENE	DL1	2500	UG/L	U	2500	500		REAL
18399	3/29/99	GW06285TE	NAPHTHALENE	TR1	10	UG/L	U	10	1		REAL
18499	3/18/99	GW06286TE	NAPHTHALENE	TR1	5.0	UG/L	U	5.0	1		REAL
18499	3/18/99	GW06286TE	NAPHTHALENE	DL1	5000	UG/L	U	5000	1000		REAL
18499	3/18/99	GW06286TE	NAPHTHALENE	DL1	40.0	UG/L	U	40.0	4		REAL
18599	3/2/99	GW06289TE	NAPHTHALENE	TR1	1200000	UG/L	U	1200000	4000	UJ1	REAL
18599	3/2/99	GW06289TE	NAPHTHALENE	DL1	0.50E+08	UG/L	U	0.50E+08	160000	1	REAL
18599	3/18/99	GW06307TE	NAPHTHALENE	TR1	5.0	UG/L	U	5.0	1		REAL
18599	3/18/99	GW06307TE	NAPHTHALENE	DL1	2500	UG/L	U	2500	500		REAL
18599	3/18/99	GW06307TE	NAPHTHALENE	TR1	10.0	UG/L	U	10.0	1		REAL
18699	3/22/99	GW06290TE	NAPHTHALENE	TR1	5.0	UG/L	U	5.0	1		REAL
18699	3/22/99	GW06309TE	NAPHTHALENE	TR1	5.0	UG/L	U	5.0	1		DUP
18699	3/22/99	GW06310TE	NAPHTHALENE	TR1	0.81	UG/L	JB	5.0	1		RNS
18699	3/22/99	GW06290TE	NAPHTHALENE	TR1	9.5	UG/L	U	9.5	1	UJ	REAL
18699	3/22/99	GW06309TE	NAPHTHALENE	TR1	9.5	UG/L	U	9.5	1	UJ	DUP

Appendix A
Select IHSS 118.1 Lab Data

Location	Sample Date	Sample #	Analyte	Result Type	Result	Units	Lab Qual	Det Lim	Dilution	Valid	QC Type
18699	3/22/99	GW06310TE	NAPHTHALENE	TR1	9.1	UG/L	U	9.1	1	U	RNS
18799	3/26/99	GW06291TE	NAPHTHALENE	TR1	50.0	UG/L	U	50.0	10.0	UJ	REAL
18799	3/29/99	GW06291TE	NAPHTHALENE	TR1	10	UG/L	U	10	1		REAL
771 FD OUT #2	3/26/99	GW06313TE	NAPHTHALENE	TR1	5	UG/L	U	5	1		REAL
771 Manhole #3	3/26/99	GW06312TE	NAPHTHALENE	TR1	5	UG/L	U	5	1		REAL
MW 771 Manhole	3/30/99	GW06318TE	NAPHTHALENE	TR1	5	UG/L	U	5	1		REAL
18199	3/17/99	GW06283TE	NITRATE	TR1	3	MG/L		0.5			REAL
18299	3/17/99	GW06284TE	NITRATE	TR1	0.29	MG/L		0.5			REAL
18399	3/17/99	GW06285TE	NITRATE	TR1	5.7	MG/L		0.05	5		REAL
18499	3/17/99	GW06286TE	NITRATE	TR1	0.05	MG/L	U	0.5			REAL
18599	3/17/99	GW06307TE	NITRATE	TR1	0.05	MG/L	U	0.5			REAL
18699	3/23/99	GW06310TE	NITRATE	TR1	0.05	MG/L		0.05		J1	RNS
18699	3/17/99	GW06309TE	NITRATE	TR1	0.06	MG/L		0.05		J1	DUP
18699	3/17/99	GW06290TE	NITRATE	TR1	0.06	MG/L		0.05		J1	REAL
18799	3/17/99	GW06291TE	NITRATE	TR1	2.2	MG/L		0.05			REAL
18199	3/24/99	GW06283TE	PHENANTHRENE	TR1	9.9	UG/L	U	9.9	1	V1	REAL
18299	3/17/99	GW06284TE	PHENANTHRENE	TR1	10.0	UG/L	U	10.0	1		REAL
18399	3/29/99	GW06285TE	PHENANTHRENE	TR1	10	UG/L	U	10	1		REAL
18499	3/18/99	GW06286TE	PHENANTHRENE	DL1	40.0	UG/L	U	40.0	4		REAL
18599	3/18/99	GW06307TE	PHENANTHRENE	TR1	10.0	UG/L	U	10.0	1		REAL
18699	3/22/99	GW06290TE	PHENANTHRENE	TR1	9.5	UG/L	U	9.5	1	UJ	REAL
18699	3/22/99	GW06309TE	PHENANTHRENE	TR1	9.5	UG/L	U	9.5	1	UJ	DUP
18699	3/22/99	GW06310TE	PHENANTHRENE	TR1	9.1	UG/L	U	9.1	1	U	RNS
18799	3/29/99	GW06291TE	PHENANTHRENE	TR1	10	UG/L	U	10	1		REAL
18199	3/17/99	GW06283TE	SULFATE	TR1	35	MG/L		1			REAL
18299	3/17/99	GW06284TE	SULFATE	TR1	24	MG/L		1			REAL
18399	3/17/99	GW06285TE	SULFATE	TR1	43	MG/L		1			REAL
18499	3/17/99	GW06286TE	SULFATE	TR1	21	MG/L		1			REAL
18599	3/17/99	GW06307TE	SULFATE	TR1	15	MG/L		1			REAL
18699	3/17/99	GW06290TE	SULFATE	TR1	17	MG/L		1		V1	REAL
18699	3/17/99	GW06309TE	SULFATE	TR1	18	MG/L		1		V1	DUP
18699	3/23/99	GW06310TE	SULFATE	TR1	1	MG/L	U	1		V1	RNS
18799	3/17/99	GW06291TE	SULFATE	TR1	46	MG/L		1			REAL
18199	3/17/99	GW06283TE	SULFIDE	TR1	0.041	MG/L		0.002			REAL
18299	3/17/99	GW06284TE	SULFIDE	TR1	0.045	MG/L		0.002			REAL
18399	3/17/99	GW06285TE	SULFIDE	TR1	0.046	MG/L		0.002			REAL
18499	3/17/99	GW06286TE	SULFIDE	TR1	0.05	MG/L		0.002			REAL
18599	3/17/99	GW06307TE	SULFIDE	TR1	0.029	MG/L		0.002			REAL
18699	3/17/99	GW06290TE	SULFIDE	TR1	0.058	MG/L		0.002		V1	REAL
18699	3/17/99	GW06309TE	SULFIDE	TR1	0.066	MG/L		0.002		V1	DUP
18699	3/23/99	GW06310TE	SULFIDE	TR1	0.008	MG/L		0.002		V1	RNS
18799	3/17/99	GW06291TE	SULFIDE	TR1	0.02	MG/L		0.002			REAL
05497	3/8/99	GW06305TE	TETRACHLOROETHENE	TR1	420000	UG/L		250000	800	V1	REAL
05497	3/8/99	GW06305TE	TETRACHLOROETHENE	DL1	0.50E+08	UG/L	U	0.50E+08	160000	1	REAL
18199	3/24/99	GW06283TE	TETRACHLOROETHENE	TR1	37.6	UG/L		5.0	1	UJ	REAL
18199	3/24/99	GW06283TE	TETRACHLOROETHENE	DL1	1000	UG/L	U	1000	200		REAL
18299	3/17/99	GW06284TE	TETRACHLOROETHENE	TR1	25.4	UG/L		5.0	1		REAL
18299	3/17/99	GW06284TE	TETRACHLOROETHENE	DL1	500	UG/L	U	500	100		REAL
18399	3/26/99	GW06285TE	TETRACHLOROETHENE	TR1	1250	UG/L	U	1250	250	UJ	REAL
18399	3/26/99	GW06285TE	TETRACHLOROETHENE	DL1	2500	UG/L	U	2500	500		REAL
18499	3/18/99	GW06286TE	TETRACHLOROETHENE	TR1	150	UG/L	E	5.0	1		REAL
18499	3/18/99	GW06286TE	TETRACHLOROETHENE	DL1	5000	UG/L	U	5000	1000		REAL
18599	3/2/99	GW06289TE	TETRACHLOROETHENE	TR1	1200000	UG/L	U	1200000	4000	V1	REAL
18599	3/2/99	GW06289TE	TETRACHLOROETHENE	DL1	0.50E+08	UG/L	U	0.50E+08	160000	1	REAL
18599	3/18/99	GW06307TE	TETRACHLOROETHENE	TR1	27.9	UG/L		5.0	1		REAL
18599	3/18/99	GW06307TE	TETRACHLOROETHENE	DL1	2500	UG/L	U	2500	500		REAL
18699	3/22/99	GW06290TE	TETRACHLOROETHENE	TR1	5.0	UG/L	U	5.0	1		REAL
18699	3/22/99	GW06309TE	TETRACHLOROETHENE	TR1	5.0	UG/L	U	5.0	1		DUP
18699	3/22/99	GW06310TE	TETRACHLOROETHENE	TR1	5.0	UG/L	U	5.0	1		RNS
18799	3/26/99	GW06291TE	TETRACHLOROETHENE	TR1	5.8	UG/L	J	50.0	10.0	UJ	REAL
771 FD OUT #2	3/26/99	GW06313TE	TETRACHLOROETHENE	TR1	5	UG/L	U	5	1		REAL
771 Manhole #3	3/26/99	GW06312TE	TETRACHLOROETHENE	TR1	5	UG/L	U	5	1		REAL
MW 771 Manhole	3/30/99	GW06318TE	TETRACHLOROETHENE	TR1	5	UG/L	U	5	1		REAL
05497	3/8/99	GW06305TE	TOLUENE	TR1	250000	UG/L	U	250000	800	UJ1	REAL
05497	3/8/99	GW06305TE	TOLUENE	DL1	0.50E+08	UG/L	U	0.50E+08	160000	1	REAL
18199	3/24/99	GW06283TE	TOLUENE	TR1	5.0	UG/L	U	5.0	1	UJ	REAL
18199	3/24/99	GW06283TE	TOLUENE	DL1	1000	UG/L	U	1000	200		REAL
18299	3/17/99	GW06284TE	TOLUENE	TR1	5.0	UG/L	U	5.0	1		REAL
18299	3/17/99	GW06284TE	TOLUENE	DL1	500	UG/L	U	500	100		REAL
18399	3/26/99	GW06285TE	TOLUENE	TR1	1250	UG/L	U	1250	250	UJ	REAL
18399	3/26/99	GW06285TE	TOLUENE	DL1	2500	UG/L	U	2500	500		REAL
18499	3/18/99	GW06286TE	TOLUENE	TR1	5.0	UG/L	U	5.0	1		REAL
18499	3/18/99	GW06286TE	TOLUENE	DL1	5000	UG/L	U	5000	1000		REAL
18599	3/2/99	GW06289TE	TOLUENE	TR1	1200000	UG/L	U	1200000	4000	UJ1	REAL

Appendix A
Select IHSS 118.1 Lab Data

Location	Sample Date	Sample #	Analyte	Result Type	Result	Units	Lab Qual	Det Lim	Dilution	Valid	QC Type
18599	3/2/99	GW06289TE	TOLUENE	DL1	0.50E+08	UG/L	U	0.50E+08	160000	1	REAL
18599	3/18/99	GW06307TE	TOLUENE	TR1	5.0	UG/L	U	5.0	1		REAL
18599	3/18/99	GW06307TE	TOLUENE	DL1	2500	UG/L	U	2500	500		REAL
18699	3/22/99	GW06290TE	TOLUENE	TR1	5.0	UG/L	U	5.0	1		REAL
18699	3/22/99	GW06309TE	TOLUENE	TR1	5.0	UG/L	U	5.0	1		DUP
18699	3/22/99	GW06310TE	TOLUENE	TR1	5.0	UG/L	U	5.0	1		RNS
18799	3/26/99	GW06291TE	TOLUENE	TR1	50.0	UG/L	U	50.0	10.0	UJ	REAL
771 FD OUT #2	3/26/99	GW06313TE	TOLUENE	TR1	5	UG/L	U	5	1		REAL
771 Manhole #3	3/26/99	GW06312TE	TOLUENE	TR1	1	UG/L	BJ	5	1		REAL
MW 771 Manhole	3/30/99	GW06318TE	TOLUENE	TR1	1	UG/L	JB	5	1		REAL
18199	3/17/99	GW06283TE	TOTAL ORGANIC CARBON	TR1	3	MG/L		1			REAL
18199	3/17/99	GW06283TE	TOTAL ORGANIC CARBON	TR1	3	MG/L		1			REAL
18299	3/17/99	GW06284TE	TOTAL ORGANIC CARBON	TR1	3	MG/L		1			REAL
18299	3/17/99	GW06284TE	TOTAL ORGANIC CARBON	TR1	3	MG/L		1			REAL
18399	3/17/99	GW06285TE	TOTAL ORGANIC CARBON	TR1	3	MG/L		1			REAL
18399	3/17/99	GW06285TE	TOTAL ORGANIC CARBON	TR1	3	MG/L		1			REAL
18499	3/17/99	GW06286TE	TOTAL ORGANIC CARBON	TR1	4	MG/L		1			REAL
18499	3/17/99	GW06286TE	TOTAL ORGANIC CARBON	TR1	4	MG/L		1			REAL
18599	3/17/99	GW06307TE	TOTAL ORGANIC CARBON	TR1	3	MG/L		1			REAL
18599	3/17/99	GW06307TE	TOTAL ORGANIC CARBON	TR1	3	MG/L		1			REAL
18699	3/17/99	GW06290TE	TOTAL ORGANIC CARBON	TR1	2	MG/L		1		V1	REAL
18699	3/17/99	GW06290TE	TOTAL ORGANIC CARBON	TR1	2	MG/L		1		V1	REAL
18699	3/17/99	GW06309TE	TOTAL ORGANIC CARBON	TR1	2	MG/L		1		V1	DUP
18699	3/17/99	GW06309TE	TOTAL ORGANIC CARBON	TR1	2	MG/L		1		V1	DUP
18699	3/23/99	GW06310TE	TOTAL ORGANIC CARBON	TR1	1	MG/L	U	1		V1	RNS
18699	3/23/99	GW06310TE	TOTAL ORGANIC CARBON	TR1	1	MG/L	U	1		V1	RNS
18799	3/17/99	GW06291TE	TOTAL ORGANIC CARBON	TR1	3	MG/L		1			REAL
18799	3/17/99	GW06291TE	TOTAL ORGANIC CARBON	TR1	3	MG/L		1			REAL
05497	3/8/99	GW06305TE	TOTAL XYLENES	TR1	250000	UG/L	U	250000	800	UJ1	REAL
05497	3/8/99	GW06305TE	TOTAL XYLENES	DL1	0.50E+08	UG/L	U	0.50E+08	160000	1	REAL
18199	3/24/99	GW06283TE	TOTAL XYLENES	TR1	5.0	UG/L	U	5.0	1	UJ	REAL
18199	3/24/99	GW06283TE	TOTAL XYLENES	DL1	1000	UG/L	U	1000	200		REAL
18299	3/17/99	GW06284TE	TOTAL XYLENES	TR1	5.0	UG/L	U	5.0	1		REAL
18299	3/17/99	GW06284TE	TOTAL XYLENES	DL1	500	UG/L	U	500	100		REAL
18399	3/26/99	GW06285TE	TOTAL XYLENES	TR1	1250	UG/L	U	1250	250	UJ	REAL
18399	3/26/99	GW06285TE	TOTAL XYLENES	DL1	2500	UG/L	U	2500	500		REAL
18499	3/18/99	GW06286TE	TOTAL XYLENES	TR1	5.0	UG/L	U	5.0	1		REAL
18499	3/18/99	GW06286TE	TOTAL XYLENES	DL1	5000	UG/L	U	5000	1000		REAL
18599	3/2/99	GW06289TE	TOTAL XYLENES	TR1	1200000	UG/L	U	1200000	4000	UJ1	REAL
18599	3/2/99	GW06289TE	TOTAL XYLENES	DL1	0.50E+08	UG/L	U	0.50E+08	160000	1	REAL
18599	3/18/99	GW06307TE	TOTAL XYLENES	TR1	5.0	UG/L	U	5.0	1		REAL
18599	3/18/99	GW06307TE	TOTAL XYLENES	DL1	2500	UG/L	U	2500	500		REAL
18699	3/22/99	GW06290TE	TOTAL XYLENES	TR1	5.0	UG/L	U	5.0	1		REAL
18699	3/22/99	GW06309TE	TOTAL XYLENES	TR1	5.0	UG/L	U	5.0	1		DUP
18699	3/22/99	GW06310TE	TOTAL XYLENES	TR1	5.0	UG/L	U	5.0	1		RNS
18799	3/26/99	GW06291TE	TOTAL XYLENES	TR1	50.0	UG/L	U	50.0	10.0	UJ	REAL
05497	3/8/99	GW06305TE	trans-1,2-DICHLOROETHENE	TR1	250000	UG/L	U	250000	800	V1	REAL
05497	3/8/99	GW06305TE	trans-1,2-DICHLOROETHENE	DL1	0.50E+08	UG/L	U	0.50E+08	160000	1	REAL
18199	3/24/99	GW06283TE	trans-1,2-DICHLOROETHENE	TR1	5.0	UG/L	U	5.0	1	UJ	REAL
18199	3/24/99	GW06283TE	trans-1,2-DICHLOROETHENE	DL1	1000	UG/L	U	1000	200		REAL
18299	3/17/99	GW06284TE	trans-1,2-DICHLOROETHENE	TR1	5.0	UG/L	U	5.0	1		REAL
18299	3/17/99	GW06284TE	trans-1,2-DICHLOROETHENE	DL1	500	UG/L	U	500	100		REAL
18399	3/26/99	GW06285TE	trans-1,2-DICHLOROETHENE	TR1	1250	UG/L	U	1250	250	UJ	REAL
18399	3/26/99	GW06285TE	trans-1,2-DICHLOROETHENE	DL1	2500	UG/L	U	2500	500		REAL
18499	3/18/99	GW06286TE	trans-1,2-DICHLOROETHENE	TR1	5.0	UG/L	U	5.0	1		REAL
18499	3/18/99	GW06286TE	trans-1,2-DICHLOROETHENE	DL1	5000	UG/L	U	5000	1000		REAL
18599	3/2/99	GW06289TE	trans-1,2-DICHLOROETHENE	TR1	1200000	UG/L	U	1200000	4000	V1	REAL
18599	3/2/99	GW06289TE	trans-1,2-DICHLOROETHENE	DL1	0.50E+08	UG/L	U	0.50E+08	160000	1	REAL
18599	3/18/99	GW06307TE	trans-1,2-DICHLOROETHENE	TR1	5.0	UG/L	U	5.0	1		REAL
18599	3/18/99	GW06307TE	trans-1,2-DICHLOROETHENE	DL1	2500	UG/L	U	2500	500		REAL
18699	3/22/99	GW06290TE	trans-1,2-DICHLOROETHENE	TR1	5.0	UG/L	U	5.0	1		REAL
18699	3/22/99	GW06309TE	trans-1,2-DICHLOROETHENE	TR1	5.0	UG/L	U	5.0	1		DUP
18699	3/22/99	GW06310TE	trans-1,2-DICHLOROETHENE	TR1	5.0	UG/L	U	5.0	1		RNS
18799	3/26/99	GW06291TE	trans-1,2-DICHLOROETHENE	TR1	50.0	UG/L	U	50.0	10.0	UJ	REAL
771 FD OUT #2	3/26/99	GW06313TE	trans-1,2-DICHLOROETHENE	TR1	5	UG/L	U	5	1		REAL
771 Manhole #3	3/26/99	GW06312TE	trans-1,2-DICHLOROETHENE	TR1	5	UG/L	U	5	1		REAL
MW 771 Manhole	3/30/99	GW06318TE	trans-1,2-DICHLOROETHENE	TR1	5	UG/L	U	5	1		REAL
05497	3/8/99	GW06305TE	TRICHLOROETHENE	TR1	250000	UG/L	U	250000	800	V1	REAL
05497	3/8/99	GW06305TE	TRICHLOROETHENE	DL1	0.50E+08	UG/L	U	0.50E+08	160000	1	REAL
18199	3/24/99	GW06283TE	TRICHLOROETHENE	TR1	3.0	UG/L	J	5.0	1	UJ	REAL
18199	3/24/99	GW06283TE	TRICHLOROETHENE	DL1	1000	UG/L	U	1000	200		REAL
18299	3/17/99	GW06284TE	TRICHLOROETHENE	TR1	1.1	UG/L	J	5.0	1		REAL
18299	3/17/99	GW06284TE	TRICHLOROETHENE	DL1	500	UG/L	J	500	100		REAL
18399	3/26/99	GW06285TE	TRICHLOROETHENE	TR1	1250	UG/L	U	1250	250	UJ	REAL

Appendix A
Select IHSS 118.1 Lab Data

Location	Sample Date	Sample #	Analyte	Result Type	Result	Units	Lab Qual	Det Lim	Dilution	Valid	QC Type
18399	3/26/99	GW06285TE	TRICHLOROETHENE	DL1	2500	UG/L	U	2500	500		REAL
18499	3/18/99	GW06286TE	TRICHLOROETHENE	TR1	3.4	UG/L	J	5.0	1		REAL
18499	3/18/99	GW06286TE	TRICHLOROETHENE	DL1	5000	UG/L	J	5000	1000		REAL
18599	3/2/99	GW06289TE	TRICHLOROETHENE	TR1	1200000	UG/L	U	1200000	4000	V1	REAL
18599	3/2/99	GW06289TE	TRICHLOROETHENE	DL1	0.50E+08	UG/L	U	0.50E+08	160000	1	REAL
18599	3/18/99	GW06307TE	TRICHLOROETHENE	TR1	1.0	UG/L	J	5.0	1		REAL
18599	3/18/99	GW06307TE	TRICHLOROETHENE	DL1	2500	UG/L	U	2500	500		REAL
18699	3/22/99	GW06290TE	TRICHLOROETHENE	TR1	5.0	UG/L	J	5.0	1		REAL
18699	3/22/99	GW06309TE	TRICHLOROETHENE	TR1	5.0	UG/L	J	5.0	1		DUP
18699	3/22/99	GW06310TE	TRICHLOROETHENE	TR1	5.0	UG/L	U	5.0	1		RNS
18799	3/26/99	GW06291TE	TRICHLOROETHENE	TR1	50.0	UG/L	U	50.0	10.0	UJ	REAL
771 FD OUT #2	3/26/99	GW06313TE	TRICHLOROETHENE	TR1	5	UG/L	U	5	1		REAL
771 Manhole #3	3/26/99	GW06312TE	TRICHLOROETHENE	TR1	5	UG/L	U	5	1		REAL
MW 771 Manhole	3/30/99	GW06318TE	TRICHLOROETHENE	TR1	5	UG/L	U	5	1		REAL
05497	3/8/99	GW06305TE	VINYL CHLORIDE	TR1	500000	UG/L	U	500000	800	V1	REAL
05497	3/8/99	GW06305TE	VINYL CHLORIDE	DL1	0.10E+09	UG/L	U	0.10E+09	160000	1	REAL
18199	3/24/99	GW06283TE	VINYL CHLORIDE	TR1	5.0	UG/L	U	5.0	1	UJ	REAL
18199	3/24/99	GW06283TE	VINYL CHLORIDE	DL1	1000	UG/L	U	1000	200		REAL
18299	3/17/99	GW06284TE	VINYL CHLORIDE	TR1	5.0	UG/L	U	5.0	1		REAL
18299	3/17/99	GW06284TE	VINYL CHLORIDE	DL1	500	UG/L	U	500	100		REAL
18399	3/26/99	GW06285TE	VINYL CHLORIDE	TR1	1250	UG/L	U	1250	250	UJ	REAL
18399	3/26/99	GW06285TE	VINYL CHLORIDE	DL1	2500	UG/L	U	2500	500		REAL
18499	3/18/99	GW06286TE	VINYL CHLORIDE	TR1	5.0	UG/L	U	5.0	1		REAL
18499	3/18/99	GW06286TE	VINYL CHLORIDE	DL1	5000	UG/L	U	5000	1000		REAL
18599	3/2/99	GW06289TE	VINYL CHLORIDE	TR1	2500000	UG/L	U	2500000	4000	V1	REAL
18599	3/2/99	GW06289TE	VINYL CHLORIDE	DL1	0.10E+09	UG/L	U	0.10E+09	160000	1	REAL
18599	3/18/99	GW06307TE	VINYL CHLORIDE	TR1	5.0	UG/L	U	5.0	1		REAL
18599	3/18/99	GW06307TE	VINYL CHLORIDE	DL1	2500	UG/L	U	2500	500		REAL
18699	3/22/99	GW06290TE	VINYL CHLORIDE	TR1	5.0	UG/L	U	5.0	1		REAL
18699	3/22/99	GW06309TE	VINYL CHLORIDE	TR1	5.0	UG/L	U	5.0	1		DUP
18699	3/22/99	GW06310TE	VINYL CHLORIDE	TR1	5.0	UG/L	U	5.0	1		RNS
18799	3/26/99	GW06291TE	VINYL CHLORIDE	TR1	50.0	UG/L	U	50.0	10.0	UJ	REAL
771 FD OUT #2	3/26/99	GW06313TE	VINYL CHLORIDE	TR1	10	UG/L	U	10	1		REAL
771 Manhole #3	3/26/99	GW06312TE	VINYL CHLORIDE	TR1	10	UG/L	U	10	1		REAL
MW 771 Manhole	3/30/99	GW06318TE	VINYL CHLORIDE	TR1	10	UG/L	U	10	1		REAL

Appendix B
Checklist for Determination of Biodegradation

Analyte	Concentration in most contaminated zone	Significance	Points	HSS 118.1 in Source	IHSS 118.1 Outside sourc
Oxygen	< 0.5 mg/L	Tolerated at this concentration	3	3	0
Oxygen	> 1.0 mg/L	Prohibits reductive dechlorination	-3	0	-3
Nitrate	< 1.0 mg/L	Competes with reductive pathway at higher concentrations	2	2	0
Ferrous Iron	> 1.0 mg/L	Reductive pathway possible	3	3	0
Sulfate	< 20 mg/L	Competes with reductive pathway at higher concentrations	2	0	0
Sulfide	> 1.0 mg/L	Reductive pathway possible	3	0	0
Methane	> 0.1 mg/L	Ultimate reductive daughter product	2	2	0
Redox	< 50 mV	Reductive pathway possible	1	1	0
	< -100 mV	Reductive pathway more possible	2	0	0
DOC	> 20 mg/L	Carbon and energy source - drives dechlorination	2	0	0
Temperature	> 20 degrees C	Biochemical process accelerated	1	0	0
Carbon Dioxide	> 2x background	Ultimate oxidative daughter product	1	na	na
Alkalinity	> 2x background	Results from interaction of CO2 with aquifer	1	1	0
Chloride	> 2x background	Daughter product of organic chlorine	2	0	0
Hydrogen	> 2 nM	Reductive pathway possible	3	na	na
Chloroform	Present	Daughter product of Carbon Tet.	2	2	2
Methlyene Chloride	Present	Daughter product of Chloroform.	2	2	2
Chloromethane	Present	Daughter product of Methylene Chloride	2	2	2
			Score	18	3
na - not analyzed					

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Appendix B
Checklist for Determination of Biodegradation

Analyte	Concentration in most contaminated zone	Significance	Points	HSS 118.1 in Source	IHSS 118.1 Outside sourc
Oxygen	< 0.5 mg/L	Tolerated at this concentration	3	3	0
Oxygen	> 1.0 mg/L	Prohibits reductive dechlorination	-3	0	-3
Nitrate	< 1.0 mg/L	Competes with reductive pathway at higher concentrations	2	2	0
Ferrous Iron	> 1.0 mg/L	Reductive pathway possible	3	3	0
Sulfate	< 20 mg/L	Competes with reductive pathway at higher concentrations	2	0	0
Sulfide	> 1.0 mg/L	Reductive pathway possible	3	0	0
Methane	> 0.1 mg/L	Ultimate reductive daughter product	2	2	0
Redox	< 50 mV	Reductive pathway possible	1	1	0
	< -100 mV	Reductive pathway more possible	2	0	0
DOC	> 20 mg/L	Carbon and energy source - drives dechlorination	2	0	0
Temperature	> 20 degrees C	Biochemical process accelerated	1	0	0
Carbon Dioxide	> 2x background	Ultimate oxidative daughter product	1	na	na
Alkalinity	> 2x background	Results from interaction of CO2 with aquifer	1	1	0
Chloride	> 2x background	Daughter product of organic chlorine	2	0	0
Hydrogen	> 2 nM	Reductive pathway possible	3	na	na
Chloroform	Present	Daughter product of Carbon Tet.	2	2	2
Methlyene Chloride	Present	Daughter product of Chloroform.	2	2	2
Chloromethane	Present	Daughter product of Methylene Chloride	2	2	2
			Score	18	3
na - not analyzed					

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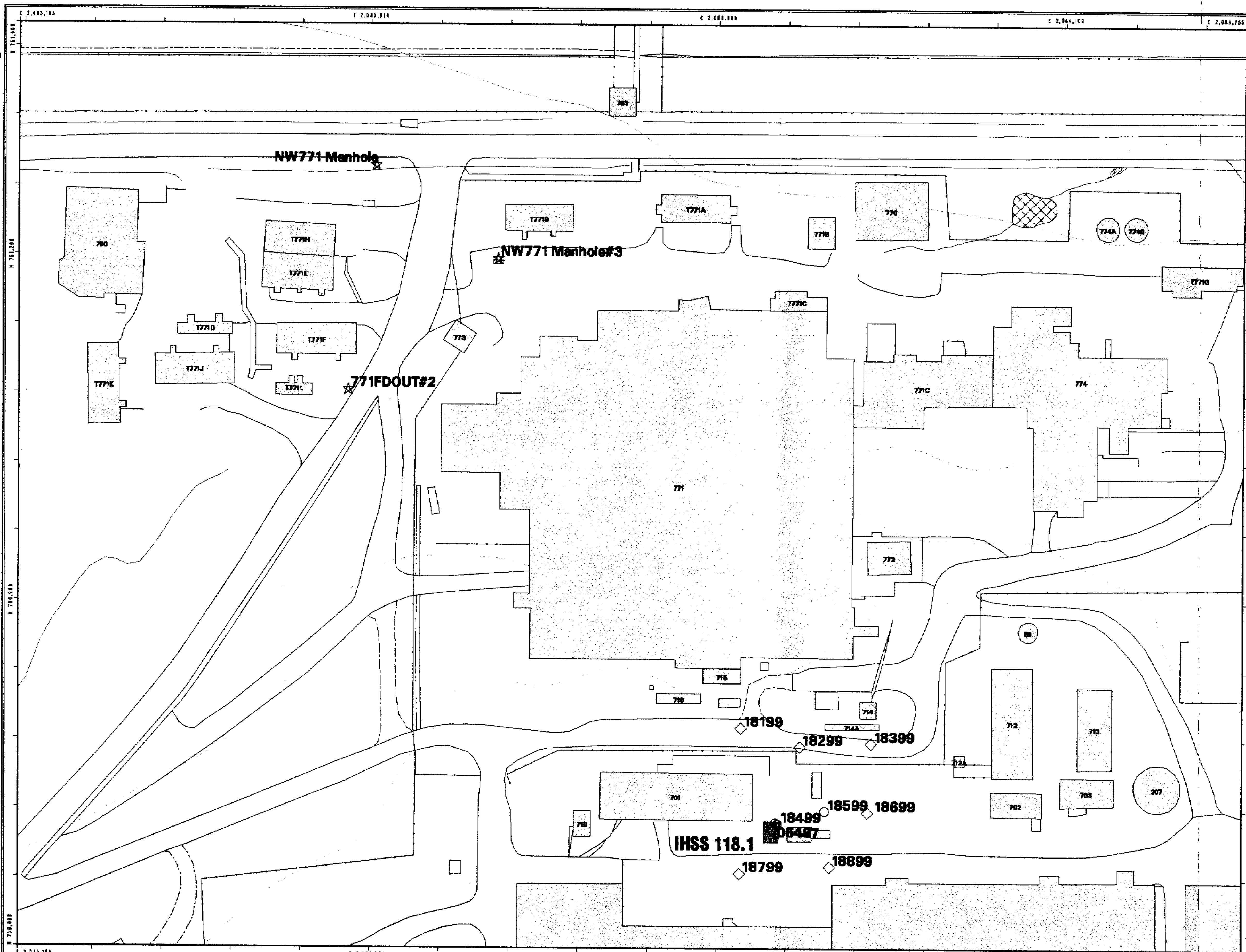

Figure 1
Location Map
IHSS 118.1 Wells

IHSS 118.1 Wells
- Alluvial Wells
- Bedrock Wells
- Alluvial/Bedrock Wells
- Surface Water Monitoring Locations
- Location of IHSS 118.1

Standard Map Features
- Buildings and other structures
- Solar Evaporation Ponds (SEP)
- Lakes and ponds
- Streams, ditches, or other drainage features
- Fences and other barriers
- Contour (20-Foot)
- Paved roads
- Dirt roads

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Scale = 1 : 1030
1 inch represents approximately 86 feet

25 0 50 100ft

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

Rocky Mountain
Remediation Services, L.L.C.
Geographic Information Systems Group
Rocky Flats Environmental Technology Site
P.O. Box 464
Golden, CO 80402-0464

MAP ID: 99-0365

September 27, 1999

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